

**THE FIRE SUPPORT COORDINATION LINE:  
OPTIMAL PLACEMENT FOR JOINT EMPLOYMENT**

A thesis presented to the Faculty of the U.S. Army  
Command and General Staff College in partial  
fulfillment of the requirements for the  
degree

**MASTER OF MILITARY ART AND SCIENCE**

by

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M.A.S., Embry-Riddle Aeronautical University, Daytona Beach, Florida, 1997

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MASTER OF MILITARY ART AND SCIENCE


THESIS APPROVAL PAGE

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

## **ABSTRACT**

**THE FIRE SUPPORT COORDINATION LINE: OPTIMAL PLACEMENT FOR JOINT EMPLOYMENT** by Major John P. Horner, USAF, 107 pages.

This thesis investigates optimal placement of the Fire Support Coordination Line (FSCL), asserting that FSCL position should correspond to a changeover in the preponderance of forces under the purviews of the Joint Force Land and Air Component Commanders (JFLCC and JFACC respectively). The thesis assesses whether FSCL placement should directly reflect the location and relative amount of combat power these component commanders intend to project against the enemy. At the depth where the JFACC's forces provide a greater amount of firepower, this FSCL identifies the transfer of coordination authority.

Analyses of Operation DESERT STORM and Prairie Warrior 98, the capstone end-of-year exercise at the US Army Command and General Staff College, assess the validity of the thesis. In both, research correlates optimal joint employment conditions with a FSCL placement that is based on the preponderance of forces.

This thesis concludes that the preponderance of forces reflects situation-specific factors and can be used as a primary consideration in the establishment of an appropriate FSCL. Determination of a preponderance of force-based FSCL is possible and doctrine should reflect its significance. Use of this FSCL enhances joint employment, allowing the US military to quickly, efficiently accomplish those objectives associated with attacking the enemy.

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## LIST OF ABBREVIATIONS

A2C2	Army Airspace Command and Control
AAR	After Action Report
ACA	Airspace Coordination Authority
ACC	Air Component Commander
ACO	Airspace Coordination Order
ACR	Armored Cavalry Regiment
AFATDS	Advanced Field Artillery Tactical Data System
AGCL	Air Ground Coordination Line
AI	Air Interdiction
ALO	Air Liaison Officer
AO	Area of Operations
AOC	Air Operations Center
AOR	Area of Operational Responsibility
APC	Armored Personnel Carrier
ARCENT	US Army Component Central Command
ASOC	Air Support Operations Center
ATACMS	Army Tactical Missile System
ATCCS	Army Tactical Command and Control System



BAI	Battlefield Air Interdiction (obsolete)
BCD	Battlefield Coordination Detachment
BCE	Battlefield Coordination Element (replaced by BCD)
C2	Command and Control
C3I	Command, Control, Communications and Intelligence
CAS	Close Air Support
CFC-Korea	Combined Forces Command-Korea
CFL	Coordinated Fire Line
CGSC	USA Command and General Staff College
CINC	Commander-in-Chief
CTAPS	Contingency Theater Automated Planning System
DBSL	Deep Battle Synchronization Line
EA	Engagement Area
EAC	Echelons Above Corps
FA	Field Artillery
FLOT	Forward Line of Own Troops
FSCL	Fire Support Coordination Line
FSCM	Fire Support Coordinating Measure
FSCOORD	Fire Support Coordinator
HPT	High Payoff Target
IRIS	Independent Research and Information Services
JFACC	Joint Forces Air Component Commander

<b>JFC</b>	<b>Joint Forces Commander</b>
<b>JFCL</b>	<b>Joint Firepower Coordination Line</b>
<b>JFLCC</b>	<b>Joint Forces Land Component Commander</b>
<b>JOA</b>	<b>Joint Operations Area</b>
<b>JP</b>	<b>Joint Publication</b>
<b>JULLS</b>	<b>Joint Universal Lessons Learned System</b>
<b>km</b>	<b>Kilometer(s)</b>
<b>KTO</b>	<b>Kuwaiti Theater of Operations</b>
<b>LCC</b>	<b>Land Component Commander</b>
<b>LRST</b>	<b>Long Range Surveillance Teams</b>
<b>mm</b>	<b>millimeter</b>
<b>MMAS</b>	<b>Master of Military Art and Science</b>
<b>MDMP</b>	<b>Military Decision Making Process</b>
<b>METT-T</b>	<b>Mission, Enemy, Troops, Terrain and Weather, and Time Available</b>
<b>MLRS</b>	<b>Multiple Launch Rocket System</b>
<b>MTW</b>	<b>Major Theater War</b>
<b>NATO</b>	<b>North Atlantic Treaty Organization</b>
<b>OCA</b>	<b>Offensive Counterair</b>
<b>OPLAN</b>	<b>Operations Plan</b>
<b>PL</b>	<b>Phase Line</b>
<b>PW 98</b>	<b>Exercise Prairie Warrior 1998</b>
<b>RAP</b>	<b>Rocket-assisted Projectiles</b>

RFL	Restrictive Fire Line
RIPL	Reconnaissance and Interdiction Planning Line (obsolete)
SAMS	School of Advanced Military Studies at the USA CGSC
SEAD	Suppression of Enemy Air Defenses
SP	Self-propelled
TACS	Theater Air Control System
TAGS	Theater Air-Ground System
TAIS	Tactical Airspace Integration System
TBM	Theater Battle Management
TBMCS	Theater Battle Management Core System
TLAM	Tomahawk Land Attack Missile
TOW	Tube-launched, Optically Tracked, Wire-guided, Heavy Antitank Missile System

## CHAPTER ONE

### INTRODUCTION

The nature of modern warfare demands that we fight as a joint team. This was important yesterday, it is essential today, and it will be even more imperative tomorrow.<sup>1</sup>

General John M. Shalikashvili, Joint Vision 2010

#### The Need to Coordinate Joint Fires

The US military continues to upgrade its capability to project overwhelming force on the enemy at all depths on the battlefield. Operation DESERT STORM underscored the awesome firepower that these forces can bring to war. The weapons employed were extremely lethal, and the ground scheme of maneuver was executed at an unprecedented tempo. As more advanced and lethal weapons systems emerge, joint fire coordination measures must evolve to capitalize on their increased capabilities. Joint military doctrine, as written in publications like Joint Vision 2010, must also be updated to implement these modern, effective coordination measures. Success in future conflicts will hinge on the ability of US commanders to orchestrate joint fires with maneuver to a degree unmatched by the enemy.

## The Fire Support Coordination Line

Among present measures that facilitate effective land, air, and sea integration is the Fire Support Coordination Line (FSCL), which is defined in Joint Publication 1-02 as:

A line established by the appropriate land or amphibious commander to ensure coordination of fire not under the commander's control but which may affect current tactical operations. The fire support coordination line is used to coordinate fires of air, ground, or sea weapons systems using any type of ammunition against surface targets. The fire support coordination line should follow well-defined terrain features. The establishment of the fire support coordination line must be coordinated with the appropriate tactical air commander and other supporting elements. Supporting elements may attack targets forward of the fire support coordination line without prior coordination with the land or amphibious force commander provided the attack will not produce adverse surface effects on or to the rear of the line. Attacks against surface targets behind this line must be coordinated with the appropriate land or amphibious force commander. Also called FSCL.<sup>2</sup>

This thesis assesses whether the preponderance of the forces attacking the enemy from the land and air should be a primary consideration in determining where the FSCL is placed.

For joint and combined operations on the scale of a major theater war, the "appropriate land or amphibious commander" is usually the Joint Force Land Component Commander (JFLCC) or LCC for brevity. The LCC is designated by the Joint Force Commander (JFC) to direct ground operations focused on achieving certain campaign or operation objectives set forth by the JFC. According to joint doctrine, the LCC is the "supported" commander for joint fires into the LCC area of operation (AO).<sup>3</sup> Other functional commanders play a "supporting" role in achieving those campaign objectives. The LCC utilizes the

FSCL to ensure fires are effectively integrated, providing unity of effort and an appropriate means to prevent the conflict of the land, sea, and air forces operating in and around the AO. This coordination measure usually supports an envisioned maneuver scheme. In general, the firepower provided by forces of a supporting air commander which occurs short of the FSCL must be authorized and closely coordinated by a theater air control system (TACS) aligned with the LCC's land maneuver force. This ensures friendly positions are not inadvertently attacked and the efforts are unified to support the LCC's scheme of maneuver. This maneuver scheme is typically designed to achieve those LCC objectives assigned by the JFC.<sup>4</sup> Targets beyond the FSCL may generally be attacked by joint forces without such detailed integration.

Prior to the Gulf War, the FSCL was typically utilized as a "permissive" fire support measure.<sup>5</sup> The LCC's limited capability to acquire and engage targets between the FSCL and AO forward boundary permitted US Air Force, Navy, and Marine Corps aircraft and other forces to engage targets beyond the FSCL without close and detailed coordination with LCC forces. However, some significant technological and doctrinal developments have impacted FSCL use and placement. Advances in technology have tremendously enhanced the ground commander's ability to conduct operations throughout the depth of the LCC AO and US Army doctrine has evolved to capitalize on them. For example, the Army Tactical Missile System (ATACMS) Block IA, with a projected effective range of 300 kilometers (km), might typically be employed well beyond the FSCL norms of airland battle doctrine.<sup>6</sup> Attack helicopters are increasingly used as a

deep maneuver asset, operating throughout the depth of the AO, well beyond the forward edge of the battle area (FEBA).<sup>7</sup> AH-64 Apaches conducted strikes in DESERT STORM on enemy early warning radar sites much deeper than the FSCL, helping achieve objectives assigned to the air component commander before any ground offensive maneuvers began.

In conjunction with greater LCC emphasis on deep operations, the FSCL has been increasingly utilized as a “restrictive” measure. This evolution has occurred to ensure land forces firing long of the FSCL enhance unity of targeting effort and do not inadvertently fire on friendly air forces operating in the AO beyond the FSCL. Accordingly, the LCC is often required to coordinate to a much greater degree with the JFC’s other component commanders when any LCC fires and maneuvers occur beyond the FSCL.<sup>8</sup>

US military forces have become increasingly interdependent. The LCC shares extensive battlespace beyond the FSCL with an air counterpart, the Joint Force Air Component Commander (JFACC), or ACC for brevity. Like the LCC, the ACC is designated by the JFC and directed to achieve certain JFC-assigned campaign objectives. In determining who will act as ACC, the JFC typically considers the amount and type of air forces participating in the operation and the service leadership available to command them. The ACC, who may be a USAF, USN, or USMC officer, has the preponderance of the air assets and the command and control (C2) means to direct them. The ACC is “supported” by the other component commanders in achieving specific JFC-assigned objectives. For example, the ACC will normally function as the supported commander for the

JFC's theater interdiction and air interdiction (AI) effort, part of which occurs in the LCC AO.<sup>9</sup> The resulting overlap of battlespace and fires can potentially blur control and coordination authority measures in an LCC AO. As a possible means to deal with this problem, the LCC can place the FSCL at the maximum range of organic fire support systems, ensuring these fires always occur inside the FSCL and, therefore, do not require coordination with the ACC.<sup>10</sup> Unfortunately, this option can place a significant and undue burden on ACC assets operating in support of both commanders' assigned objectives.

Conversely, the FSCL can be placed close to the friendly ground forces in the AO, maximizing the chances for air forces to conduct attacks uninhibited by extensive and detailed coordination measures. Obviously, coordination restrictions on LCC fires long of this FSCL would place an undue and unacceptable burden on LCC forces in the AO and limit joint employment and potential success.

US Army "high tempo maneuvers" exacerbate the problem. During offensive operations, ground forces can maneuver at speeds which require a timely and effective fire support system to detect and engage enemy forces much deeper in the AO. Accordingly, a typical FSCL must be placed further forward and adjusted more often or, in the interest of simplicity, be initially established significantly deeper into the LCC AO.<sup>11</sup> Unfortunately, this option can and has caused problems. According to General Charles A. Horner, the ACC in DESERT STORM,



I had trouble with the FSCL placement. For the first five weeks, the FSCL was the border with Saudi Arabia. At one point after the ground war started, the FSCL was [moved to a position] well north of the Tigris River, yet all the Iraqi army was on the interstate highway between Kuwait City and Basra approaching the river from the south, making the river an ideal FSCL.... The Iraqi army was getting across the river, giving them a free ride since we [the air forces] had to attack under close air support rules with no FACs [Forward Air Controllers] in the area.<sup>12</sup>

Apparently, better fire support coordination measures (FSCM), including a more appropriate and effective FSCL placement, could have denied Iraqi ground forces an opportunity to avoid the coalition's land and air forces during the ground offensive. It is critical that future LCCs understand and consider the factors that apply to appropriate FSCM use and FSCL placement.

### Thesis Statement

Recent efforts have attempted to resolve problems with joint fires integration, but US Army and joint training exercises still present instances where FSCLs are inappropriately established at the maximum employment range of the LCC's organic fire systems, thus limiting the overall effectiveness of the joint force.<sup>13</sup> Joint doctrine provides considerations regarding FSCL establishment but offers little definitive guidance on an optimal placement depth in terms of a range beyond the forward line of own troops (FLOT). The LCC and ACC control a variety of forces operating in and around the AO. These forces provide a variety of capabilities in terms of maneuver, protection, and firepower. In the context of this thesis, the "preponderance of forces" is measured in terms of those forces' weapons effects on potential enemy targets. Therefore, ownership of the preponderance of force implies that a given component commander has more

combat power, in terms of some relative and quantifiable magnitude, at a given location on the battlefield. The LCC generally controls the preponderance of forces which fire on targets close to the FLOT while the ACC typically conducts operations with the preponderance of the forces operating and employing on targets deeper in the AO (see figure 1). Accordingly, a typical AO can be delineated at the depth where ownership of the preponderance of forces engaging the enemy shifts from the LCC to the ACC. This thesis assesses whether the preponderance of forces changeover depth should determine FSCL placement to maximize the success of joint combat operations. Accordingly, the thesis question is: Should the preponderance of forces be a primary consideration in determining placement of the FSCL?

## The LCC Area of Operations

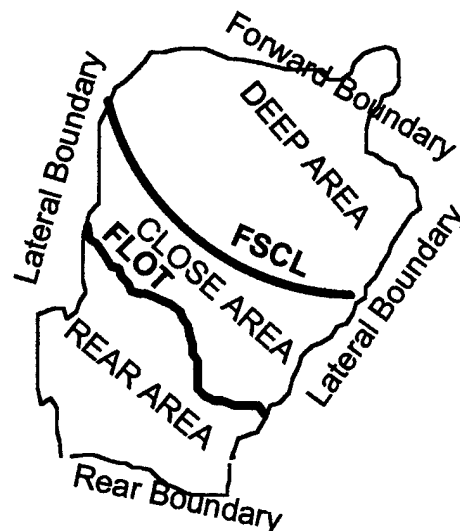


Figure 1

### Subordinate Questions

To address the thesis topic, several subordinate questions must be answered. Question one is, In the context of recent history, where have the various land and air forces been typically employed and how does the corresponding “preponderance of force” FSCL measure up against actual FSCL placement? Given a major operation such as Operation DESERT STORM, an analysis assesses the practicality and validity of the theory. Based on after action reports (AARs) and a known outcome, consideration focuses on the effectiveness of the coordination measures and their impact on operational success.

Subordinate questions must also determine thesis applicability to current or future operations. For conceptual analysis question two is, What are the number and type of LCC forces participating in the AO and what are their projected employment locations and depths? A review of doctrine and an analysis of US Army systems can establish how and where potential land forces might operate in a given scenario. Question three is, What are the number and type of ACC forces participating in the AO and what are their projected employment locations and depths? A review of doctrine and an analysis of US Air Force systems provides insight as to where air forces may be employed in a given scenario.

Question four addresses thesis FSCL depth, Which component commander controls the preponderance of the forces at various depths in a typical AO? For analysis, the thesis statement is applied to a basic scenario and projects the depth at which a changeover in the preponderance of forces occurs--

from the LCC to the ACC. Finally, question five is, Does this preponderance changeover depth correspond to an appropriate depth for FSCL establishment? A basic wargaming analysis of this and other potential FSCLs can assess the extent of any relationship that exists between the preponderance of forces and the optimal FSCL.

### Related Issues

Several related issues affect FSCL placement and must be considered in the context of the preponderance of forces analysis. The component commander controlling the preponderance of forces in a region may not be well suited to coordinate with other forces operating and employing in that region. For instance, the LCC may be able to focus enormous combat power from an ATACMS into a free-fire zone downrange in the AO but possess little capability to orchestrate a near-real time re-targeting effort. When assigning a functional commander such as the ACC, joint doctrine directs the JFC to consider a preponderance of forces and the ability to command and control applicable forces.<sup>14</sup> Clearly, the coordination capability implied with C2 may not correspond to the preponderance of forces, as in a free-fire zone scenario.

Who should determine FSCL location? As US military forces become increasingly interdependent, joint fire integration becomes a paramount concern. If the LCC is designated the "supported" commander for all air operations inside the AO, that LCC should retain responsibility for placement. Subjugating this authority to lower echelons of command should be avoided, as it can result in

coordination problems with the ACC, including ragged coordination boundaries between the subordinate ground commanders' sectors. FSCL placement is an operational-level issue. Although FSCL establishment occurs in the LCC AO, it impacts joint forces that support both LCC and ACC operations and objectives. The increased interdependence of US air and ground forces dictates that decisions affecting joint firepower be well thought out and closely coordinated. Accordingly, the LCC must work closely with the ACC to ensure the FSCL meets both their needs and that the coordination process enhances a seamless joint operation. At the point where competing interests cannot be balanced, the JFC should ultimately determine placement. Interestingly, the "preponderance FSCL" suggested by the thesis minimizes the impact of this issue as the forces employed in an operation determine FSCL location, freeing the component commanders to focus on how best to utilize it.

What restrictions should be applied with the FSCL or other coordination measures? In the application of doctrine, theater CINCs have directed that fixed-wing air operations inside the FSCL be classified as Close Air Support (CAS), requiring detailed integration with the friendly forces in "close proximity" to operations.<sup>15</sup> This denies air and land forces the opportunity to fully exploit AI sorties. Concurrently, the different combatant commands have different requirements for the LCC in the coordination of land force fires beyond the FSCL. The doctrinally directed "consulting with the ACC" implies more than an informative call that fire is inbound, but the extent of consultation is debatable.

The utility of the FSCL, as it is currently defined, is questionable in the context of current fire coordination measures. Recent debates center on the issue of the component commander AOs and battlespace.<sup>16</sup> A "joint fire control line" at the forward boundary of the LCC AO would clarify responsibilities. Linear coordination measures within the LCC AO become more obsolete as the ground forces become increasingly mobile. Fires beyond the LCC AO would support the ACC; fires inside would support the LCC and require detailed coordination. Projected command and control systems will have the capability to relay and rapidly update changes to the LCC AO forward boundary as they occur. The ACC could control the very deep and high battle and the LCC could control the relatively close and rear battle, with both directing operations in fulfillment of the JFC-assigned objectives.

Should the FSCL follow "well-defined terrain features" in the modern battlefield, as the doctrinal definition asserts? The increased positional awareness of the air and land forces and the increased use of digitization makes coordinate and grid-line related FSCLs possible. Improved command and control measures associated with battlefield upgrades in information processing technologies allow for the smoother, more efficient coordination of firepower. The next war's airspace coordination order (ACO) may simply contain a statement directing pilots to use certain coordination measures when attacking within a given distance of friendly ground positions.

### Assumptions

This thesis assumes that US military operations follow the current doctrinal guidance provided in the Joint Publications (JPs). Accordingly, FSCL location is ultimately mission, enemy, terrain and weather, troops and time available (METT-T) dependent.<sup>17</sup> The preponderance of forces should reflect these environmental factors in the form of operational methods and tactics applied to a scenario with stated objectives. Correspondingly, the preponderance of forces is assessed as an additional primary consideration. Placement also considers other factors outlined in the joint publications such as enemy location and type of operations.<sup>18</sup>

This thesis is only applicable to scenarios where linear coordination measures are appropriate. In simple terms, linear coordination measures present a line on a map that delineates the preponderance of forces with the ACC assets long and the LCC assets short. Accordingly, the LCC AO is assumed to be geographically bounded and large enough to require FSCL establishment.

### Topic Limitations

Research focuses on FSCL establishment relative to a major theater war (MTW) scenario. Discussion is limited to US Army and US Air Forces and applications toward the Central Command (CENTCOM) and Combined Forces Command-Korea (CFC-Korea) Areas of Operational Responsibility (AORs). Other service and coalition forces and systems such as the Tomahawk Land Attack Missile (TLAM) are not considered. Also, thesis results may not be directly

applicable to operations in other AORs or to smaller scale contingencies with different missions and objectives.

Although airspace control measures and other FSCMs can significantly enhance or degrade the effectiveness of operational and support fires, this thesis focuses only on the FSCL. Other FSCMs will generally be established in addition to or in conjunction with the FSCL but their impact is not assessed here. C2 measures are not analyzed including those that facilitate the LCC's capability to employ fires long of the FSCL, such as Advanced Field Artillery Tactical Data System (AFATDS) or the Theater Battle Management Core System (TBMCS).

Focus is limited to forces providing long range, lethal weapons effects, primarily air, aviation, field artillery and rocket systems, conceding that other systems which operate in and around the AO are critical to the success of these forces. This scope assumes that weapons delivery capability is supported by C2 processing systems to decide on targets and sensors for target detection and tracking.

The targeting process is not directly addressed. It could be argued that the FSCL has been occasionally used as a tool by the LCC in an effort gain greater control of air forces and more responsive fire support.<sup>19</sup> Analysis of this concept is beyond the scope of this thesis, but the importance of an effective joint targeting process must be acknowledged.

Discussion of FSCL utility in the 2010 digitized battlefield will be limited, realizing that advances in digitization will increase positional awareness, lending to updated FSCMs and procedures based on ground force locations and



identification means versus geographic terrain features and timing means. Scope is limited by assuming that LCC forces with improved firepower and maneuver capabilities will still not provide the preponderance of forces throughout the entire depth of the AO. This increased capability causes a FSCL based on the preponderance of forces to shift deeper into the AO.

Finally, this thesis does not attempt to resolve the issue of how to quantify a “preponderance of force” or exactly where the preponderance of force changeover occurs. At the risk of oversimplification, the limited scope assumes away potential problems in balancing “apples and oranges” with respect to the various air and land forces. Potentially, digitization will enhance the capability of systems to provide a quick and accurate assessment of where the changeover in preponderance of forces occurs as component commanders plan and program operations. The current emphasis on joint operations necessitates a means to compare land and air force systems and capabilities.

### Operational Definitions

A conceptual understanding and comprehension of several key terms is required to grasp the FSCL issue. In particular, a common understanding of the joint definitions ensures members of all services communicate effectively and share a vision of joint fire coordination. Therefore, the operational definitions applicable to this thesis are provided.

Air Interdiction (AI) Air operations conducted to destroy, neutralize, or delay the enemy’s military potential before it can be brought to bear effectively

against friendly forces at such a distance from friendly forces that detailed integration of each air mission with the fire and movement of friendly forces is not required.<sup>20</sup>

Area of Operations (AO) An operational area defined by the joint force commander for land and naval forces. Areas of operations do not typically encompass the entire operational area of the joint force commander, but should be large enough for component commanders to accomplish their missions and protect their forces.<sup>21</sup>

Battlespace The conceptual physical volume in which the commander seeks to dominate the enemy. It expands and contracts in relation to the commander's ability to acquire and engage the enemy, or can change as the commander's vision of the battlefield changes.<sup>22</sup>

Close Air Support (CAS) Air action by fixed- and rotary-wing aircraft against hostile targets which are in close proximity to friendly forces and which require detailed integration of each air mission with the fire and movement of those forces. Also called CAS.<sup>23</sup>

Coordinated Fire Line (CFL) A line beyond which conventional surface fire support means (mortars, field artillery, naval gunfire ships) may fire at any time within the zone of the establishing headquarters without additional coordination. It is usually established by brigade or division but may be established by a maneuver battalion.<sup>24</sup>

Deep Operations Those operations directed against enemy forces and function which are not in contact at the FLOT, line of departure, or friendly

perimeter and are between the FLOT or perimeter and the forward boundary of the unit conducting the operation.<sup>25</sup>

Fire Support The delivery of all types of ordnance through both direct and indirect means, as well as nonlethal means, that contribute to the destruction, disruption, or suppression of the enemy, facilitate tactical movement, and achieve a decisive impact.<sup>26</sup>

Forward Boundary The farthest limit, in the direction of the enemy, of an organization's responsibility. The organization is responsible for deep operations to that limit. The next higher headquarters is responsible for coordination of deep operations beyond that limit. In offensive operations, the forward boundary may move from phase line to phase line, depending on the battlefield situation.<sup>27</sup>

Interdiction An action to divert, disrupt, delay, or destroy the enemy's surface military potential before it can be used effectively against friendly forces.<sup>28</sup>

Joint Operations Area (JOA) An area of land, sea, and airspace, defined by a geographic combatant commander or subordinate unified commander, in which joint force commander (normally a joint task force commander) conducts military operations to accomplish a specific mission. Joint operations areas are particularly useful when operations are limited in scope and geographic area or when operations are to be conducted on the boundaries between theaters. Also called JOA.<sup>29</sup>

Maneuver: Employment of forces on the battlefield through movement in combination with fire, or fire potential, to achieve a position of advantage in respect to the enemy in order to accomplish the mission.<sup>30</sup>

### Research Design

Chapter 3 presents the methodology used to address the previously mentioned subordinate questions. This includes the constructs for an historical analysis of Operation DESERT STORM to determine if a "preponderance of force" FSCL would have enhanced joint employment.

The remaining subordinate questions are then detailed in order to assess thesis validity. The methodology presents a means with which the depth at which a changeover in the preponderance of forces can be determined and applied to a given scenario. Finally, a basic wargaming analysis is detailed to determine if this FSCL placement yields optimal joint employment results.

### Summary

FSCMs have a significant impact on the US military's ability to attain campaign and operation objectives, and the FSCL is a measure of particular importance to both land and air forces. Chapter 2 reviews literature regarding its placement and application while chapter 3 provides the research design to assess thesis validity. Chapters 4 and 5 provide the thesis analysis in historical and conceptual situations. Conclusions, including potential use, and recommendations, including areas for further study, are contained in chapter 6.

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<sup>1</sup> US Department of Defense, Joint Vision 2010 (Washington, DC: Office of the Joint Chiefs of Staff, 1996), Chairman's Message.

<sup>2</sup> US Department of Defense, Joint Chiefs of Staff Publication 1-02, Department of Defense Dictionary of Military and Associated Terms (Washington,

DC: Office of Joint Chiefs of Staff, 1994 as amended through 12 January 1998), 167.

<sup>3</sup> US Department of Defense, Joint Chiefs of Staff Publication 3-56.1, Command and Control of Joint Air Operations (Washington, DC: Office of Joint Chiefs of Staff, 1995), II-3.

<sup>4</sup> US Department of Defense, Joint Chiefs of Staff Publication 3-0, Doctrine for Joint Operations (Washington, DC: Office of Joint Chiefs of Staff, 1995), III-34.

<sup>5</sup> JP 3-0, III-34.

<sup>6</sup> Patrecia S. Hollis, "Making the Most of Airpower," Field Artillery Journal (September-October 1996): 4.

<sup>7</sup> US Army, Field Manual 100-5, Operations, Final Draft, (Washington, DC: Department of the Army, 5 August 1997), 6-1 through 6-3.

<sup>8</sup> JP 3-0, III-34.

<sup>9</sup> JP 3-56.1, II-3.

<sup>10</sup> JP 3-0, III-34.

<sup>11</sup> Ibid.

<sup>12</sup> Charles A. Horner, General, USAF (Retired), telephone interview by the author, Fort Leavenworth, KS, 1 February 1998.

<sup>13</sup> Dennis J. Reimer, General, USA, and Ronald R. Fogleman, General, USAF, "Joint Warfare and the Army-Air Force Team," Joint Force Quarterly, Spring 1996, 10.

<sup>14</sup> JP 3-56.1, II-2.

<sup>15</sup> Horner, interview.

<sup>16</sup> Michael J. McMahon, Major, USA, "The Fire Support Coordination Line-- A Concept Behind Its Times?" (SAMS Monograph, CGSC, 1994), 39-40.

<sup>17</sup> JP 3-0, III-34.

<sup>18</sup> Ibid.

<sup>19</sup> Horner interview.

<sup>20</sup> JP 1-02, 18.

<sup>21</sup> Ibid., 54.

<sup>22</sup> US Army, Field Manual 101-5-1, Operational Terms and Graphics (Washington, DC: Department of the Army, 1997), 1-18 - 1-19.

<sup>23</sup> JP 1-02, 76.

<sup>24</sup> FM 101-5-1, 1-39.

<sup>25</sup> Ibid., 1-47.

<sup>26</sup> Ibid., 1-66.

<sup>27</sup> Ibid., 1-70.

<sup>28</sup> JP 1-02, 221.

<sup>29</sup> Ibid., 237.

<sup>30</sup> Ibid., 262.

## CHAPTER TWO

### LITERATURE REVIEW

Adherence to dogmas has destroyed more armies and cost more battles than anything in war.<sup>1</sup>

J.F.C. Fuller, Air Force Basic Doctrine

Placement of the FSCL is addressed in several forums. The Joint Publications Library offers the most extensive source of joint doctrine while unified command and service publications discuss the FSCL in specific context and relate placement to operational theaters. Following a review of this doctrinal information, US Army and Air Force periodicals, theses and monographs are presented with discussion of the particularly critical debate regarding fire support coordination measures and their impact on joint operations.

#### Joint Publications

JPs provide the primary source of information used by all services regarding the FSCL. These publications define the terminology and concepts that are mutually understood and agreed upon by the services. More importantly, JPs provide authoritative guidance for service members to follow unless exceptional circumstances dictate otherwise.<sup>2</sup>

JP 0-2, Unified Action Armed Forces (UNAAF), dated 24 February 1995, provides joint guidance in establishing command relationships. In particular, the

JP discusses "supported" and "supporting" commander responsibilities in detail. The relationships and responsibilities stem from the JFC's authority to organize forces, establish command relationships and assign responsibilities to provide unity of effort and centralized planning with decentralized execution.<sup>3</sup> The JFC typically designates functional component commanders to achieve operational objectives and delegates subordinate "command authority."<sup>4</sup> The JFC also designates the operating relationships among the functional component commanders in terms of support requirements. Specifically, JP 0-2 states that a "supported" commander has "the authority to exercise general direction of supporting effort" including the designation and prioritization of targets and objectives, and providing instructions necessary for coordination and efficiency.<sup>5</sup> The "supporting" commander then "determines the forces, tactics, methods, procedures, and communication to be employed in providing this support."<sup>6</sup> These relationships are vital in determining who exercises command and control over forces operating in and around the LCC AO.

JP 3-0, Doctrine for Joint Operations, dated 1 February 1995, provides the fundamentals for planning joint operations and describes the roles of the JFC, JFACC, and JFLCC in more detail. It reemphasizes the requirement for the JFC to establish supported and supporting relationships between components.<sup>7</sup> Coordination measures are discussed in Chapter III, including guidance on the FSCL. It states that FSCLs are "permissive" and established or adjusted by the appropriate land or amphibious force commander inside the LCC forward boundary.<sup>8</sup> The publication provides guidance as to where the FSCL should be



placed, stating careful consideration must be placed on factors such as the location of enemy forces, the anticipated rates of movement, tempo of operations and weapons capabilities.<sup>9</sup> It relates that FSCLs are normally positioned closer to the FLOT in the defense than in the offense but that exact placement is situation dependent.<sup>10</sup>

Additionally, JP 3-0 states, "By establishing an FSCL at sufficient depth so as to not limit high-tempo maneuver, land or amphibious force commanders ease the coordination requirements for attack operations within their AOs by forces not under their control, such as naval gunfire or air interdiction."<sup>11</sup> This direction clearly conveys that optimal placement must balance maneuver space and firepower limitations.

Finally, JP 3-0 dictates that commanders employ restrictive measures to enhance the protection of friendly forces beyond an FSCL, apparently refining the degree of "permissiveness." The publication cautions that coordination is critical to avoiding conflicts and redundant attack operations beyond the FSCL but allows that "in exceptional circumstances, the inability to conduct this coordination will not preclude the attack of targets beyond the FSCL."<sup>12</sup>

JP 3-03, Doctrine for Joint Interdiction Operations, dated 10 April 1997, provides the fundamental considerations and guidance for successful interdiction operations. It relates that "synchronizing interdiction and maneuver and their joint fires enhances the ability for each to more fully contribute to a successful outcome of a campaign or major operation."<sup>13</sup> Enforcing the need for the LCC to fire deep into an AO, JP 3-03 states that supported commanders "usually attempt

to strike interdiction targets with organic assets first.”<sup>14</sup> The pub reiterates JP 3-0 guidance regarding FSCL placement considerations and suggests the JFC assign Joint Operation Area (JOA)-wide interdiction operations to the “component commander with a preponderance of the interdiction assets with theater- and/or JOA-wide range and the ability to control them. In most cases, the ACC.”<sup>15</sup> Finally, JP 3-03 cautions that “Establishment of the FSCL too far forward of friendly forces can limit the responsiveness of air interdiction sorties.”<sup>16</sup>

JP 3-09, “Doctrine for Joint Fire Support,” is in draft format for coordination and not available for direct review and reference. The US Army, as lead agent for the publication, has proposed a Second Final Coordination Draft, dated 8 July 1997. According to Major Scott Schaeffer, USAF, an Air Force Doctrine Command staff officer, Air Force leadership does not concur with elements of the publication, as currently written.<sup>17</sup> In particular, the draft publication defines “joint fires” as the effects of all lethal or non-lethal weapons that achieve strategic, operational, or tactical actions supporting major operation or campaign objectives.<sup>18</sup> Moreover, it asserts that the ground or maritime commander is the supported commander for all such “joint fires” in an AO. Accordingly, firepower from all air forces in the LCC AO is fire support to the LCC, even if these “fires” were planned and suited to support the ACC effort. Potentially, the fires of operational interdiction and strategic missions aimed at achieving ACC objectives could not, by definition, occur in the LCC AO.<sup>19</sup> The JP differentiates “close operations” as those short of the FSCL “in immediate contact” with friendly forces, like CAS, and deep operations as those beyond with the FSCL, such as AI,

strategic attack, suppression of enemy air defenses and offensive counter-air.<sup>20</sup>

Apparently, the authors of this publication perceive the FSCL as best employed as a means to delineate CAS and AI missions.

JP 3-09.3, Joint, Tactics, Techniques and Procedures for Close Air Support (CAS), dated 1 December 1995, further defines CAS operations, describing CAS as “a tactical level operation” under the purview of the ACC who “exercises command and control over assigned forces through the theater air control system (TACS).”<sup>21</sup> The TACS provides the detailed integration required due to the close proximity of friendly ground forces. Regarding FSCMs within the LCC AO, the publication mentions several means with which to coordinate and prevent the conflict of forces and fires but provides no definitive guidance on how to use these measures.<sup>22</sup>

JP 3-56.1, Command and Control for Joint Air Operations, published on 14 November 1994, provides guidance on the ACC’s authority and command relationships. In chapter II, it states “the JFC will normally assign JFACC responsibilities to the component commander having the preponderance of air assets and the capability to plan, task, and control joint air operations.”<sup>23</sup> It is important to reemphasize that the ACC is not necessarily from the USAF and that air or other forces are not exclusively provided by the USAF or any other single service. The fact that “preponderance of air assets” is considered here lends credence to the thesis statement that the preponderance of forces is a valid consideration in some applications of doctrine and may provide a useable means to delineate coordination authority.

JP 3-56.1 also asserts that the ACC functions as the "supported" commander for the JFC's overall air interdiction effort and states, "Interdiction target priorities within the land or naval force areas of operations (AOs) are designated by the land and naval component commanders," which the ACC will use in planning and executing the AOR-wide interdiction effort.<sup>24</sup> However, the ACC functions as a supporting commander, "as directed by the JFC," for CAS and AI within the land and naval component AOs.<sup>25</sup> In other words, the JFC will generally be directive as to whether the AI missions in the LCC AO support LCC operations and objectives or ACC operations and objectives.

JP 3-52, Doctrine for Joint Airspace Control in the Combat Zone, published on 22 July 1995, states that the JFC should normally direct the ACC to perform airspace control authority (ACA) and area air defense duties. With a focus on unity of effort, these duties normally include the responsibility to coordinate and integrate forces of the various components which use the airspace of the JOA. Of course, this does not imply operational or tactical control over these assets, but does convey that the ACC normally commands the preponderance of forces using JOA airspace and also operates the most capable airspace C2 systems. The publication further relates that the ACA is responsible for the airspace control plan, which should include FSCMs.<sup>26</sup> The implication is that all forces operating in the vertical dimension of shared battlespace, including ground-based missile, rocket and artillery systems, should coordinate through measures similar to those used by an air traffic control system. Such a plan would likely permit fires inside the FSCL without coordination with the ACC but not beyond.

### Unified Command Publications

The unified commands provide further insight in the application of guidance provided in the JPs. Within the scope of this thesis, CENTCOM and CFC-K instructions are reviewed with regard to FSCL placement.

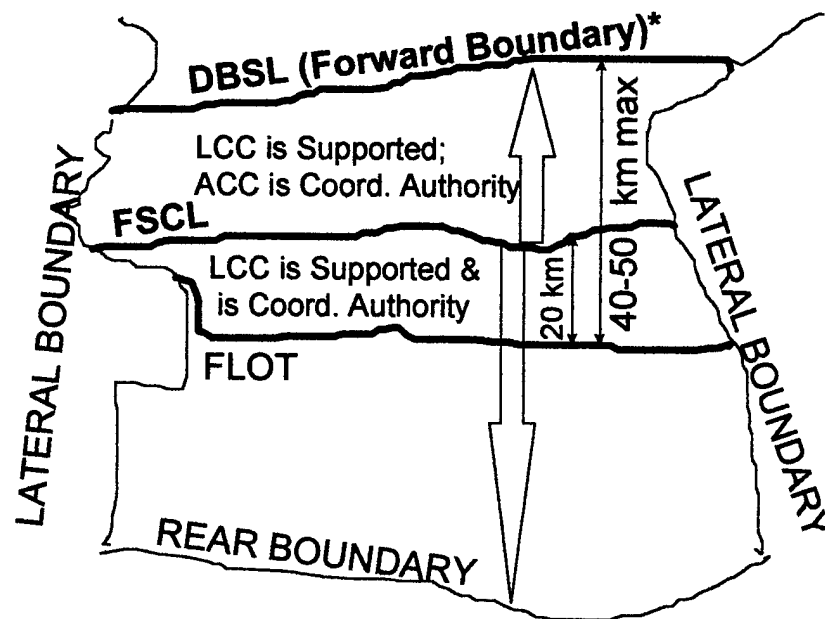
USCENTCOM Regulation 525-1, Warfighting Instructions, apply joint doctrine to forces operating in the Central Command AOR and, in particular, the Persian Gulf. Chapter III contains guidance for the employment of joint fires and asserts that all indirect fires over the FSCL will be cleared through the Theater Air Control System (TACS), "100% of the time."<sup>27</sup> In this theater, the FSCL acts as a "restrictive" FSCM on LCC fire support. USCENTCOM FSCL applications will be reviewed in further detail in chapter 4.

Korean theater deep operations are outlined in the Deep Operations Primer-Korea. In Chapter II, the primer details the responsibilities of the functional components, tasking the ACC to "synchronize and integrate all air operations and fires beyond the FSCL."<sup>28</sup>

The primer defines an additional coordination measure in chapter VI--the Deep Battle Synchronization Line (DBSL). This line, which augments the FSCL, is normally established 40 to 50 kilometers from the FLOT.<sup>29</sup> In the context of joint doctrine and this thesis, this line equates to the forward boundary of the AO in its delineation of command relationships.<sup>30</sup> The LCC is the supported commander short of the DBSL except for ACC operational AI missions, and the ACC is the supported commander beyond it. However, the Primer designates the ACC the "coordinating authority" for operational fires between the FSCL, which is

normally within 20 kilometers of the FLOT, and the DBSL (see figure 2).<sup>31</sup> The LCC is required to coordinate with the ACC prior to employing organic fires long of the FSCL.<sup>32</sup> This arrangement has received praise from General Ronald R. Fogleman, USAF (Retired), the former Chief of Staff of the Air Force.<sup>33</sup> The construct in Korea implies that the ACC has the better command and control means over the fires into the space between the FSCL and DBSL but that the LCC has the primary interest in the interdiction and targeting plan.

## CFC-Korea AO Construct



\*Beyond the DBSL, the ACC is supported and coord. authority

Figure 2

## Service Publications

The USAF JFACC Primer offers an in-depth discussion on the FSCL issue, while providing differing service views on interdiction and deep operations.

The following, while extensive, is taken verbatim to add emphasis:

**AIRMAN'S PERSPECTIVE:** The component commanders with forces at risk beyond the FSCL are the JFACC and the Special Operations Component Commander. The JFACC's C3I architecture is uniquely capable of planning and controlling operations in territory occupied by hostile forces. The JFACC is responsible for a number of missions, none of which is geographically bounded. Responsibility for synchronizing theater interdiction assets should be vested in the commander who has the preponderance of attack assets and the C3I capability to conduct these operations; for interdiction it is normally the JFACC.

**ALTERNATE PERSPECTIVE:** Longer range weapons such as Army Tactical Missile Systems (ATACMS) and the ability to see deeper with systems like JSTARS increase the capabilities ground commanders possess to influence the battlefield at greater ranges. Corps Commanders should be responsible for controlling all operations within their areas of operations.

**COMPARISON:** Just as synchronization of all attack assets is critical to the land component commander (LCC) for all fires inside the FSCL, so it is critical to the Air Component Commander for all attacks beyond the FSCL. All operations inside the FSCL are restricted by control requirements for troop safety. For example, artillery fires use Danger Close procedures while air operations must be controlled by a Forward Air Controller. The FSCL should be placed to maximize risk to the enemy. In the late stages of the Korean War the bomb line was placed as little as 300 meters from the front line of troops. When the FSCL was placed beyond the Euphrates River, well in advance of friendly forces, in the last stage of DESERT STORM, this effectively created a sanctuary for Iraqi Republican Guards forces escaping the Allied advance. Maneuver force boundaries could also affect the joint force effort, depending on where they are placed and the maneuver commander's method of synchronizing maneuver, fire support, and supporting interdiction operations. Several factors influence maximizing risk to the enemy. Ground force artillery locations are influenced by enemy counter-battery capabilities; longer range weapons are expensive and scarce; it becomes difficult or impossible to determine the effectiveness of artillery and missile systems when they fire at targets that can't be observed.

CONCLUSION: The most reliable way to maximize the enemy's risk is to place the FSCL at the range where artillery and missiles stop being the greatest threat to the enemy and air attack becomes the greatest threat. All operations beyond the range of observed fires should be under the purview of the JFACC when friendly forces aren't maneuvering.<sup>34</sup>

Army FM 100-5, Operations (Final Draft dated 5 Aug 1997) provides insight into Army "operations in depth" and the importance "deep operations" play, especially with respect to high tempo operations.<sup>35</sup> FM 100-5 guidance tends to focus at the tactical level of war, with emphasis on operations in depth designed to affect and complement the operations of brigades and subordinate units.<sup>36</sup> However, the FM stresses the need for synchronization and unity of effort with joint forces and discusses "interdiction by ground and air maneuver and fires, either singly or in combination" but without providing the details for integration.<sup>37</sup>

FM 100-103-2/ACCP 50-54, Theater Air-Ground System (TAGS), a multi-service publication, reiterates JP 3-0 guidance and provides discussion of the additional coordination measures to facilitate joint fire planning and execution options.<sup>38</sup> Concerning boundaries, the FM states: "Theater air sorties are not constrained by surface boundaries per se; however, since the airspace above surface areas is used by all components of the joint force, JFCs establish airspace control measures."<sup>39</sup> This guidance tends to conflict with draft JP 3-09 guidance regarding fires provided by air forces going into the LCC AO. Airspace control measures are usually accomplished with a coordination altitude, with FSCL principles applying in the vertical. The FM also discusses AI, stating LCCs can "specifically identify those interdiction targets they are unable to strike with organic assets within their boundaries that could affect planned or ongoing



maneuver...to afford added visibility and allow the JFC to give priority to targets directly affecting planned maneuver.”<sup>40</sup> The JFACC will then plan and execute the theater-wide air interdiction effort.<sup>41</sup> Of relevance to this thesis, the publication highlights the concept that as range from the FLOT increases, air forces will be increasingly utilized to provide fire. At some depth, a handover in capability to engage targets occurs between the LCC and ACC.

Army FM 6-20-10, Tactics, Techniques, and Procedures for the Targeting Process, dated 8 May 1996, provides discussion about FSCMs and their impact on targeting. Particular to this thesis, the FM states:

From the JFC's perspective, a target is selected for strategic and/or operational reasons. A decision is subsequently made whether to attack the target and, if it is to be attacked, which system will attack it. The targets selected or nominated in this process must support the JFC's campaign plan and contribute to the success of present and future major operations. The JFC relies on his tactical level commanders to effectively orchestrate the targeting process. Control measures, such as a fire support coordination line (FSCL), must be repositioned as needed to take full advantage of all assets available to the joint force commander. The JFC best influences the outcome of future tactical battles by setting the conditions for those battles and allocating resources to the service components.<sup>42</sup>

Discussion emphasizes the JFC's role in directing operations and, among other things, determining FSCL placement.

FM 6-20-10 also provides an excellent in-depth review of procedures to coordinate operations between the FSCL and Forward Boundary, including the use of the Battlefield Coordination Detachment (BCD) and the Air Operations Center (AOC).<sup>43</sup> Imbedded in the discussion is the point that an air liaison officer (ALO) will be present in the LCC tactical operations center to participate in the

war-gaming process and advise on Air Force concerns regarding FSCMs.<sup>44</sup> This point supports the concept that planners must thoroughly consider any FSCM implication on joint employment to be successful. This concept is incorporated in chapter 5 of this thesis. Finally, the FM provides discussion of the various weapons and their capabilities referenced in chapter 5.<sup>45</sup>

Army FM 6-20-30, Fire Support in Corps and Division Operations, states that if the commander's intent is to destroy enemy forces, the FSCL should be placed as close as possible to friendly forces.<sup>46</sup> This assertion implies that a free-fire zone provides greatest destruction of the enemy and would be especially applicable to scenarios where the safety of air forces and unity of effort are not paramount when compared to other factors, such as the potential of friendly land forces being overrun.

#### Books and Periodicals

The book The General's War: The Inside Story of the Conflict in the Gulf reviewed coalition performance in Operation DESERT STORM and emphasized the importance of proper FSCL placement, stating, "After the war, it became clear that the positioning of the boundary (FSCL) was one of the most important miscalculations in the final hours of the war."<sup>47</sup> The authors Michael Gordon and Lieutenant General Bernard Trainor, USMC, assert that to some degree, improper FSCL use and placement contributed to the escape of Republican Guard forces along the Basra highway.<sup>48</sup> With respect to the thesis question, the book reinforces the concept that a deep FSCL was used to ease the coordination

requirements of a small number of LCC forces. Such an application's detriments, in terms of the negative impact on air force effectiveness, outweigh its benefits.

The US Army's performance in the Gulf War is portrayed in Certain Victory, a book written under the direction of Brigadier General Robert Scales. Material from the book is referenced in chapter 4. The performance of the US Air Force, as well as other airpower sources, is detailed in Gulf War Air Power Survey Summary Report, written by Doctor Thomas Kearney and Doctor Eliot Cohen. Chapter 4 further references relevant material from the book.

"Integrating Joint Doctrine: The FSCL in the Lantican Theater of Operations," by Colonel William S. Knightly, USA, which was published in the Military Review, discusses joint fires as applied in the 1996 Prairie Warrior Exercise at the US Army Command and General Staff College and advocates a more clear delineation in ACC and LCC roles and responsibilities.<sup>49</sup> Relevant material from the article is used in the conceptual analysis of chapter 5.

#### Theses and Monograms

Major David Zook, USA, wrote extensively about Operation DESERT STORM FSCL use in a 1992 US Army Command and General Staff College (CGSC) Master of Military Art and Science (MMAS) thesis titled "The Fire Support Coordination Line: Is It Time To Reconsider Our Doctrine?" Major Zook thoroughly reviews and analyzes FSCM issues that arose in and as a result of the Gulf War.<sup>50</sup> Apparently, the thesis has been a source for doctrinal change as several recommendations have been incorporated into the JPs. Major Zook's

work capsulizes many AARs and lessons learned as a result of the conflict and is further referenced in the thesis analysis of chapter 4.

Major Mark Eshelman, USA, wrote a monograph in 1993 at the School of Advanced Military Studies (SAMS), titled "ACC Control of Army Deep Fire Assets," recommending that the LCC relinquish control of Army deep fire assets at the operational level to support the JFC's interdiction effort.<sup>51</sup> Objectives and responsibility for this effort are often assigned to the ACC and can occur outside the LCC AO. Major Eshelman asserts that in order to compensate the LCC for loss of the use of these assets, efforts should be directed at ensuring ACC interdiction operations focus on supporting the LCC maneuver scheme.<sup>52</sup>

This monograph delineates the joint battle area with the US Army called on to "close with and destroy the enemy by means of fire and maneuver."<sup>53</sup> The US Air Force supports this with CAS and the AI missions which have "a near term impact on the close battle, formerly called Battlefield Air Interdiction (BAI)."<sup>54</sup> Correspondingly, Army forces should play a supporting role to the AF responsibility to conduct "operational interdiction"--those missions not in direct support of the tactical close-in fight. One justification is that Corps commanders and below primarily fight tactical battles and that AF assets tend to operate at the operational level.<sup>55</sup> The monograph asks, but does not attempt to answer whether a theory of preponderance should apply when assigning the FSCL.<sup>56</sup>

Major Robert D'Amico, USAF, wrote a thesis in 1997 at the Naval War College, titled "Joint Fires Coordination: Service Specialties and Boundary Challenges," exploring the potential need for further demarcation between the

deep and close battles. The thesis asserts that joint doctrine was inadequate regarding economy of force and unity of effort when conducting joint fires, especially with respect to the region from the FSCL to the forward boundary. The author recommends the creation of larger coordination elements assigned to the staffs of the designated supported commanders. Additionally, it advocates a FSCL that provides the LCC with adequate maneuver space to independently conduct deep operational maneuvers.<sup>57</sup> The thesis conclusion: "Efforts must be placed on synchronizing AI with the ground operational maneuver through liaison elements--communication and teamwork are key."<sup>58</sup> Essentially, this thesis supports a FSCL placement as close as practical to the FLOT with emphasis on improving the LCC's ability to both maneuver and coordinate organic fires beyond it. Technology can enhance this ability in the form of improved command and control capability.<sup>59</sup>

Colonel Terry L. New, while a USAF student of the Air War College in 1995, wrote a monograph titled, "Where to Draw the Line Between Air and Land Battle." Colonel New's work focused on where a line between the air and land battle should be placed and who should control operations on either side.<sup>60</sup> He focuses on the FSCL as a restrictive measure and supports a suggestion by General (Retired) Merrill A McPeak, a former USAF Chief of Staff, that modern land battle should best be divided with the ACC responsible for the "deep and high" battles and the LCC responsible for the "close and rear" battles.<sup>61</sup> The monograph suggests that, "with modification, the FSCL can provide an appropriate mechanism to divide responsibilities between air and land

commanders.”<sup>62</sup> This modification calls for more ACC involvement in determining FSCL placement.

The monograph also asserts a predominant Air Force view that the FSCL is restrictive, with attacks beyond the line needing to be coordinated with the ACC, as witnessed in Operation DESERT STORM.<sup>63</sup> It provides legitimacy to this assertion by detailing the various air operations and fixed-wing forces operating beyond the FSCL and refuting an Army perception of minimal fratricide risk associated with a “big sky-little bullet theory.”<sup>64</sup> Colonel New’s conclusion: avoid duplication of effort and ensure unity of command by delineating control at the FSCL.<sup>65</sup>

Major Michael McMahon, USA, contributed to FSCL literature in 1994 with a SAMS monograph titled, “The Fire Support Coordination Line--A Concept Behind Its Times?” This monograph addresses the question of whether the concept of the FSCL should be included in future joint doctrine.<sup>66</sup> Major McMahon maintains that the FSCL is being exclusively used to prevent the conflict of fires rather than to emphasize and facilitate the complimentary capabilities of the various joint systems. As such, the FSCL should be eliminated, with the ground commanders using the forward boundary as a means to deconflict fires and achieve unity of effort within their AOs, in conjunction with more efficient command and control means for coordination beyond the AO. Applicable to this thesis is the inherent assumption that the preponderance of forces throughout the AO, including CAS sorties, belong to the LCC.<sup>67</sup>

The monograph provides a review of the historical development of the FSCL and reiterates the “permissive” interpretation as written in joint doctrine, yet “restrictive” application by the JFCs in CENTCOM and CFC-Korea.<sup>68</sup> To avoid such restrictions, the author relates that the LCC can place the FSCL at the maximum range of the ground organic firing assets.<sup>69</sup>

There is also discussion regarding operational and support fires. Operational fires are applied against targets that have “a direct impact in the conduct of a campaign or major operation.” Such fires are planned and synchronized at the operational level, normally under the purview of the JFACC.<sup>70</sup> It reiterates that according to joint doctrine, operational fires and operational maneuver are coequals and must be integrated to accomplish the JFC’s intent.<sup>71</sup> It is important to note that support fires, as provided by CAS missions in support of operational maneuver in the LCC AO are different from operational fires, such as AI missions flown in support of the achievement of objectives assigned to the ACC. These AI missions are flown throughout the theater and without regard to land or naval component commander boundaries.<sup>72</sup> Finally, Major McMahon relates use of the FSCL in Operation DESERT STORM, referenced in more detail in the chapter 4 analysis of this thesis.<sup>73</sup>

Major Robert Barry, USA, wrote a SAMS monograph titled “Who’s Zooming Who? Joint Doctrine and the Army-Air Force Debate Over the FSCL.” He reiterates FSCL evolution and issues regarding application along service lines.<sup>74</sup> The monogram recommends removing the term from doctrine and instituting a new term, the Air Ground Coordination Line (AGCL), defined as:

A temporary line established by the JFC within the land component commander's AO used to delineate the area of responsibility for the planning, coordination, synchronization, and control of all maneuver, fires, and interdiction. Short of the AGCL the JFLCC will have responsibility for maneuver, fires and interdiction. Beyond the AGCL the JFACC will have these same responsibilities. Components will not conduct any operation outside their respective areas (i.e. beyond the AGCL for the JFLCC) without the permission of the affected commander. The JFC will not direct any operations into these areas without first advising the respective component commanders. The AGCL will only be moved by the JFC after consulting with the JFLCC and JFACC.<sup>75</sup>

Unfortunately, this definition and subsequent discussion provide little insight with regard to the depth of placement or the factors on which to base the AGCL. However, the definition does convey support for this thesis in that the LCC would be in control of forces short of the AGCL and the ACC would have control of forces long--preponderance is assumed.

### Summary

Chapter 2 explored the significance of the FSCL as it affects joint operations and highlighted some differences of opinion and interpretation of doctrine along air and land component lines. The significance of the issue is highlighted by the amount of literature that has been written, some of which is along parochial lines and with bias toward its author's service. Chapter 3 will next provide the methodology to address the validity of this thesis.

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<sup>1</sup> US Air Force, Air Force Doctrine Document 1, Air Force Basic Doctrine (Maxwell Air Force Base, AL: Headquarters Air Force Doctrine Center, 1997), 73.

<sup>2</sup> US Department of Defense, Joint Chiefs of Staff Publication 3-0, Doctrine for Joint Operations (Washington, DC: Office of the Joint Chiefs of Staff, 1995), i.



<sup>3</sup> US Department of Defense, Joint Chiefs of Staff Publication 0-2, Unified Action Armed Forces (UNAAF) (Washington, DC: Office of Joint Chiefs of Staff, 1995), IV-2.

<sup>4</sup> Ibid., III-10.

<sup>5</sup> Ibid., III-11.

<sup>6</sup> Ibid.

<sup>7</sup> JP 3-0, II-8.

<sup>8</sup> Ibid., III-34.

<sup>9</sup> Ibid.

<sup>10</sup> Ibid.

<sup>11</sup> Ibid.

<sup>12</sup> Ibid.

<sup>13</sup> US Department of Defense, Joint Chiefs of Staff Publication 3-03, Doctrine for Joint Interdiction Operations (Washington, DC: Office of the Joint Chiefs of Staff, 1997), viii.

<sup>14</sup> Ibid., ix.

<sup>15</sup> Ibid., II-7 through II-8.

<sup>16</sup> Ibid., II-15.

<sup>17</sup> Scott Scheaffer, Major, USAF, USAF Doctrine Center, interview by author, Fort Leavenworth, KS, 10 November 1997.

<sup>18</sup> Ibid.

<sup>19</sup> Ibid.

<sup>20</sup> Robert J. D'Amico, Major, USAF, "Joint Fires Coordination: Service Specialties and Boundary Challenges" (Monogram, Newport, RI: Naval War College, 1997), 3.

<sup>21</sup> US Department of Defense, Joint Chiefs of Staff Publication 3-09.3, Joint Tactics, Techniques, and Procedures for Close Air Support (CAS) (Washington, DC: Office of the Joint Chiefs of Staff, 1995), I-1, II-4.

<sup>22</sup> Ibid., IV-7 through IV-8.

<sup>23</sup> US Department of Defense, Joint Chiefs of Staff Publication 3-56.1, Command and Control for Joint Air Operations (Washington, DC: Office of the Joint Chiefs of Staff, 1994), II-2.

<sup>24</sup> Ibid., II-3.

<sup>25</sup> Ibid.

<sup>26</sup> US Department of Defense, Joint Chiefs of Staff Publication 3-52, Doctrine for Joint Airspace Control in the Combat Zone (Washington, DC: Office of the Joint Chiefs of Staff, 1995), vi - vii.

<sup>27</sup> Michael J. Barbee, Major, USA, "Minimizing Coordination Problems Between the JFACC and JFLCC in the Coordination of Joint Fires Between the FSCL and Land Component Forward Boundary" (MMAS thesis, Command and General Staff College, Fort Leavenworth, KS, 1997), 25.

<sup>28</sup> Ibid., 26.

<sup>29</sup> Patrecia S. Hollis, "Making the Most of Air Power, An Interview with General Ronald R. Fogleman, Chief of Staff of the Air Force," Field Artillery Journal. September-October 1996: 3.

<sup>30</sup> Ibid.

<sup>31</sup> Ibid.

<sup>32</sup> D'Amico, 6-10.

<sup>33</sup> Hollis, 3.

<sup>34</sup> US Air Force, JFACC Primer (Washington, DC: Department of the Air Force, 1994), 33-34.

<sup>35</sup> US Army, Field Manual 100-5, Operations (5 Aug 1997 Final Draft) (Washington, DC: Department of the Army, 1997), 7-12.

<sup>36</sup> FM 100-5, 7-13.

<sup>37</sup> FM 100-5, 7-13.

<sup>38</sup> US Army, Field Manual 100-103-2, TAGS, Multiservice Procedures for the Theater Air-Ground System (Washington, DC: Department of the Army, 1994), 68-69.

<sup>39</sup> Ibid., 68.

<sup>40</sup> Ibid., 2.

<sup>41</sup> Ibid.

<sup>42</sup> US Army, Field Manual 6-20-10, Tactics, Techniques, and Procedures for the Targeting Process (Washington, DC: Department of the Army, 1996), 1-7.

<sup>43</sup> Ibid., 3-16 through 3-27.

<sup>44</sup> Ibid., 3-19.

<sup>45</sup> Ibid., B-11 through B-12.

<sup>46</sup> US Army, Field Manual 6-20-30, Fire Support in Corps and Division Operations (Washington, DC: Department of the Army, 1989), F-4.

<sup>47</sup> Michael R. Gordon and Bernard E. Trainor, Lieutenant General, USMC, The General's War: The Inside Story of the Conflict in the Gulf (Boston: Little, Brown and Company, 1995), 199 through F2.

<sup>48</sup> JFACC Primer, 34.

<sup>49</sup> William S. Knightly, Colonel, USA, "Integrating Joint Doctrine: The FSCCL in the Lantican Theater of Operations," Military Review vol. 76 no. 4 (July-August 1996): 30-33.

<sup>50</sup> David H. Zook, Major, USA, "The Fire Support Coordination Line: Is it Time to Reconsider Our Doctrine?" (MMAS thesis, Command and General Staff College, Fort Leavenworth, KS, 1992), iii.

<sup>51</sup> Mark J. Eshelman, Major, USA, "Air Commander Control of Army Deep Fire Assets" (SAMS monograph, Command and General Staff College, Fort Leavenworth, KS, 1993), iii.

<sup>52</sup> Ibid., iii.

<sup>53</sup> Ibid., 8.

<sup>54</sup> Eshelman, 8.

<sup>55</sup> Ibid., 9.

<sup>56</sup> Ibid., 34.

<sup>57</sup> D'Amico, ii.

<sup>58</sup> Ibid., 10.

<sup>59</sup> Ibid.

<sup>60</sup> Terry L. New, Colonel, USAF, "Where to Draw the Line Between Air and Land Battle" (Monograph, Air War College, Maxwell Air Force Base, AL, 1995), 5.

<sup>61</sup> Ibid., 1.

<sup>62</sup> Ibid., 6.

<sup>63</sup> Ibid., 12.

<sup>64</sup> Ibid., 13.

<sup>65</sup> Ibid., 14.

<sup>66</sup> Michael J. McMahon, Major, USA, "The Fire Support Coordination Line, A Concept Behind its Times?" (SAMS monograph, Command and General Staff College, Fort Leavenworth, KS, 1994), iii.

<sup>67</sup> Ibid.

<sup>68</sup> Ibid., 8-15.

<sup>69</sup> Ibid., 20.

<sup>70</sup> Ibid., 16.

<sup>71</sup> Ibid.

<sup>72</sup> Robert F. Barry II, Major, USA, "Who's Zooming Who? Joint Doctrine and the Army/Air Force Debate over the FSCL" (SAMS monograph, Command and General Staff College, Fort Leavenworth, KS, 1994), 13.

<sup>73</sup> McMahon, 16-29.

<sup>74</sup> Barry, 5-29.

<sup>75</sup> Ibid., 38-39.

## CHAPTER THREE

### RESEARCH DESIGN

This research design provides the means to assess whether the thesis has past and future validity. A review of US military performance in Operation DESERT STORM judges whether, in hindsight, one can correlate an optimal FSCL location with the known firepower applied by the joint forces. An analysis of the actual forces employed during the conflict determines where a FSCL based on the preponderance of forces, or "preponderance of force FSCL," would have been located. Next, the design assesses the impact a preponderance FSCL might have had on joint effectiveness. In order to be useable as a tool for future success, the thesis concept must also be applicable to the present and future planning processes. Therefore, this research design assesses whether a preponderance FSCL corresponding to projected firepower has utility in planning effective joint operations.

#### Historical Analysis

The methodology applied in chapter 4 is a historical analysis of Operation DESERT STORM. Analysis addresses subordinate question one, In the context of recent history, where have the various land and air forces been typically employed and how does the corresponding "preponderance of force" FSCL

measure up against actual FSCL placement? The historical analysis reviews the various FSCL placements for three distinct periods--Period One: the air campaign prior to the land offensive; Period Two: the initial land offensive; and Period Three: the later land operations. Analysis is limited to USAF and USA participants and particular focus is placed on the VII Combined Corps sector, where coalition land forces were tasked to attack in zone as the main effort of the JFC's "Hail Mary" envelopment maneuver.<sup>1</sup>

The research structure first addresses issues pertinent to the coordination of fires throughout the three periods of conflict. These issues are analyzed in terms of their impact on FSCL placement and joint employment. Next, the methodology presents a review of each period's Coalition objectives and participating USA and USAF forces. This review focuses on the missions and depth of force employment to establish a preponderance of force FSCL in the VII Corps sector. Actual FSCL placement is compared to the potential preponderance of force FSCL placement. Analysis includes a discussion of the factors and issues involved in establishment of the actual FSCL. Following this analysis, FSCL impact on joint effectiveness is reviewed using data and perceptions described in the Joint Universal Lessons Learned System (JULLS) and various After Action Reports (AARs). This evaluation determines whether the actual FSCL placement had a positive or negative impact on joint employment and whether a preponderance of force FSCL may have been more appropriate.

The results for all three periods are combined and presented for an overall check of thesis consistency and validity. Discussion considers the role of the

FSCL in joint employment and, ultimately, its impact on the achievement of JFC-assigned objectives for Operation DESERT STORM.

### Conceptual Analysis

Chapter 5 presents a conceptual analysis of the impact a preponderance of force FSCL might have in a more modern but notional scenario. The scenario is provided by Exercise PRAIRIE WARRIOR 1998 (PW 98), an end of year capstone exercise at the US Army Command and General Staff College (CGSC), Fort Leavenworth, Kansas. The exercise provides a basis for possible US force structure, JFC-assigned objectives and missions, and the environmental or METT-T factors to be considered in FSCL placement. Analysis takes these given inputs to focus on FSCM issues and applications.

The analysis does not attempt to determine optimal task organization and tailoring of forces, or at the optimal employment of those forces. Instead, the analysis questions whether, given a force structure and missions, the resulting preponderance of force FSCL corresponds to that depth which enables the most effective joint employment.

Analysis is accomplished by answering the subordinate questions as listed in chapter 1. Subordinate questions two and three determine the number and type of LCC and ACC forces involved and analyze employment depth. A review of participating USA and USAF forces details the type and quantity of weapons systems involved and their capabilities. Limiting the scope of forces to exclude



Naval, Marine, special operations forces, and coalition participants presents a potential decrease in design reliability.

The fourth subordinate question compares the projected employment depths of the LCC and ACC forces provided in course of action development and determines the depth at which a changeover in preponderance of forces occurs. Starting at the FLOT and moving forward in the AO, a comparison of LCC and ACC forces establishes where the preponderance of forces switches to the ACC, as shown in figure 3. At this depth, the preponderance of force FSCL is established.

### Determining the Preponderance of Force FSCL

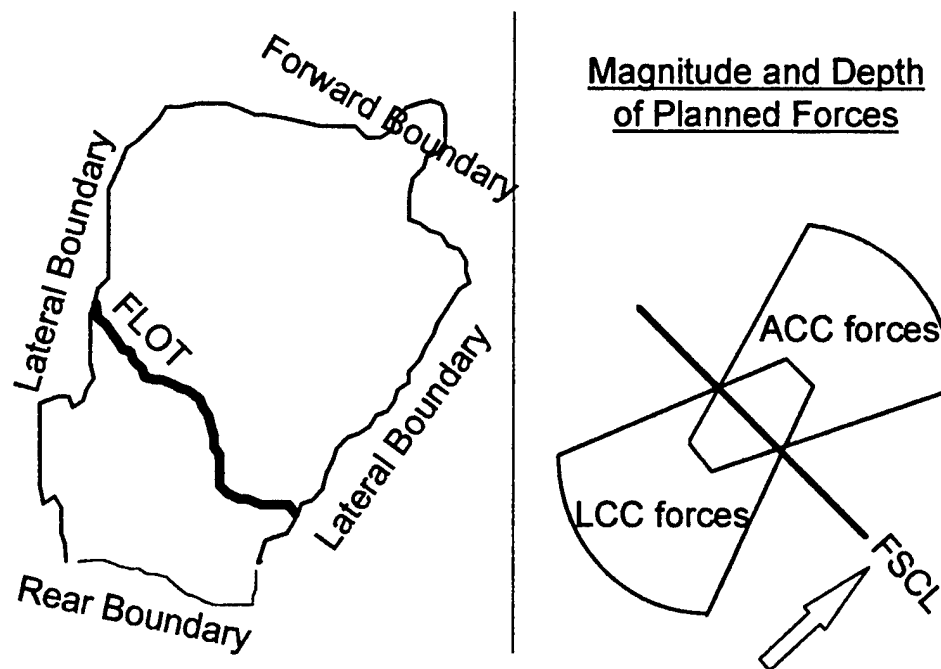


Figure 3

The fifth subordinate question analyzes preponderance of force FSCL effectiveness. This final analysis addresses the pros and cons of the preponderance of force FSCL as compared to other potential placements and assess impact of joint employment effectiveness. The methodology used in determining exactly where the preponderance of forces changeover occurs is not emphasized. Such analysis is beyond the scope of the research as it would require advanced air and land C2 systems not currently available.<sup>2</sup> Instead, thesis methodology scrutinizes whether a FSCL relating to a projected changeover in preponderance of force corresponds to optimal joint employment results as compared to other potential placements. Unfortunately, time constraints will preclude post-PW 98 analysis.

### Summary

The thesis methodology employs two methods of analysis. The first is a historical analysis performed in chapter 4. Chapter 5 uses a conceptual analysis. These two methods of analysis answer the subordinate questions which ultimately provide the basis for determining thesis validity.

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<sup>1</sup> Robert H. Scales, Jr., Brigadier General, USA, Certain Victory: The US Army in the Gulf War (Fort Leavenworth, KS: US Command and General Staff College Press, 1994), 127.

<sup>2</sup> Patrecia S. Hollis, "Making the Most of Air Power, An Interview with General Ronald R. Fogleman, Chief of Staff of the Air Force," Field Artillery Journal (September-October 1996): 5.

## CHAPTER FOUR

### HISTORICAL ANALYSIS

Everyone must use and understand common terms—maneuver commander, and fire supporter, Army and Air Force, and our allies. The most important and misunderstood term in this war [Operation DESERT STORM] seemed to be the FSCL.<sup>1</sup>

#### 24 Mechanized Infantry Division AAR

An analysis of Operation DESERT STORM assesses the validity of the “preponderance of force FSCL.” In addition to being the most recent major conflict, the 1991 Gulf War’s FSCM applications and issues are well documented. For simplicity, combat operations are divided into three distinct periods, characterized by the general type of Coalition land action. The three periods are: Period One, from 17 January to 23 Feb, the air campaign with Coalition land forces in defense; Period Two, from 24 to 26 February, the Coalition land offensive with the enemy in defense; and Period Three, from 27 to 28 February, the Coalition land offensive with the enemy withdrawing. Following the analysis of these periods, a matrix depicts the overall impact of FSCL placement on the effectiveness of joint operations.

General H. Norman Schwarzkopf, Commander-in-Chief (CINC), USCENTCOM, was the JFC during Operation DESERT STORM. The CINC’s stated objectives for the operation were:

- Attack Iraqi political-military leadership and command control.
- Gain and maintain air superiority.
- Sever Iraqi supply lines.
- Destroy known chemical, biological and nuclear production, storage and delivery capabilities.
- Destroy Republican Guards forces in the KTO [Kuwaiti Theater of Operations].
- Liberate Kuwait City.<sup>2</sup>

The CINC designated the ACC as supported for the first four objectives, and the LCC as supported for the latter two.<sup>3</sup>

### Fire Support Coordination Measure Issues

Several issues common to all periods factor into how, why, and where the various FSCLs were placed in Operation DESERT STORM. CENTCOM planners developed a four-phase course of action suited to the situation and objectives with significant emphasis on airpower.<sup>4</sup>

The AO structure tended to facilitate air employment, sometimes to the perceived detriment of land force operations. First, there was no AO forward boundary designated. Instead, the JFC used the FSCL to delineate command authority in the JOA between the LCC and ACC. The LCC was the supported commander short of the FSCL, and the ACC was the supported commander beyond it.<sup>5</sup> Within this construct, the supported commander was also designated the coordinating authority. LCC fires long of the FSCL required ACC coordination "100% of the time."<sup>6</sup> This was the first MTW with the FSCL effectively applied as a "restrictive" coordination measure to LCC fires. Coordination was defined as "informing and/or consulting with" the ACC.<sup>7</sup> The VII Corps perceived and implemented an even more restrictive application. According to Colonel Stanley

F. Cherrie (now Brigadier General, Retired), VII Corps G-3, "Beyond the FSCL was Air Force, and no fires could be delivered in that area without *clearance* [emphasis mine] by the Air Component."<sup>8</sup> With regard to FSCMs, the integration of land-based firepower in the JOA effectively hit a "wall" at and in the form of the FSCL.

By standard doctrinal convention, ACC missions applying firepower short of the FSCL required coordination with the LCC. Based on ACC guidance, CENTCOM directed that the FSCL be also used as the routine means to delineate close air support (CAS) missions, as those flown short of the FSCL, and air interdiction (AI) missions, as those flown long of the FSCL.<sup>9</sup> The basis for this decision was that CAS missions supported the LCC effort and required "detailed integration" and "close proximity" land force coordination whereas AI missions supported the ACC and required air force integration to the theater interdiction effort.<sup>10</sup>

During Operation DESERT STORM, the NATO concept of allocating Battlefield Air Interdiction (BAI) missions to the LCC was not utilized. Used previously by units in the central European region, including VII Corps, BAI missions were distributed to support the LCC with a near term impact on the land close battle but without the "detailed integration due to close proximity" CAS requirement.<sup>11</sup> In relation to this FSCL application, these missions could have been flown on either side of the line.<sup>12</sup> Instead, a Joint Targeting Coordination Board (JTCB), eventually under the direction of the deputy JFC, Lieutenant General Calvin Waller, USA, determined the interdiction targeting plan and

priorities. The need to employ fires on targets with near-term effects on the ground operation were addressed in the context of the overall targeting plan with joint emphasis on unity of effort.<sup>13</sup> Figure 4 shows the DESERT STORM JOA and LCC AO construct.

### Example of CENTCOM JOA/LCC AO Construct

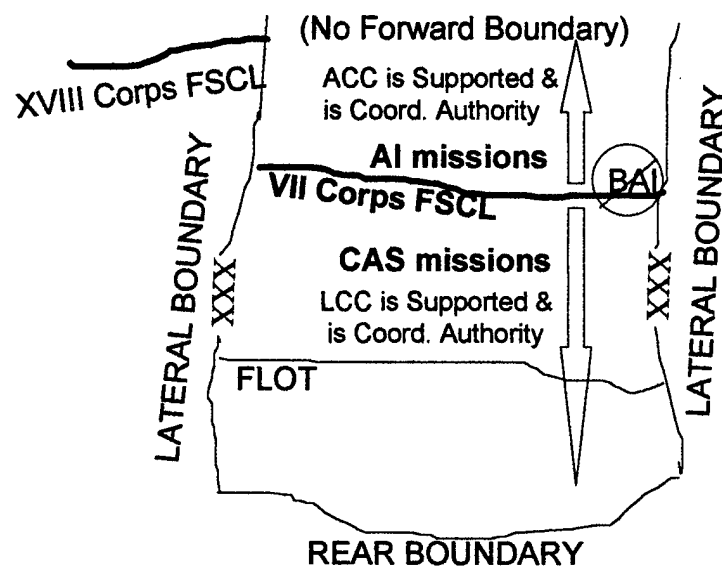


Figure 4

Another coordination issue pertained to the command relationships established for combat operations. In lieu of appointing an LCC, the JFC retained direct authority over the land forces. This decision seems somewhat appropriate when considering the scale of operations and the political sensitivities involved with the large multi-service and coalition land force.<sup>14</sup> Regardless of the reasons

for this decision, General Schwarzkopf remained firmly in charge of all-aspects of land offensive planning.<sup>15</sup>

The command arrangement led to some negative side-effects regarding FSCMs. Doctrinally, General Schwarzkopf, as the LCC, was the “appropriate land or amphibious commander” directly in charge of FSCL placement. However, he effectively subordinated this task to the corps commanders during the land offensive.<sup>16</sup> During this time, General Schwarzkopf directed his efforts toward JFC duties at the theater level, such as minimizing the impact of Iraq’s scud missile operations in the JOA. To some extent, this JFC/LCC arrangement effectively by-passed the leadership and staff of Lieutenant General John Yeosock, commander of the US Army Forces Central Command (ARCENT), an otherwise reasonable candidate for overall LCC duties.<sup>17</sup> The result was often a poorly coordinated FSCL with jagged edges along the corps lateral boundaries as the four corps commanders established FSCLs in their individual zones of operation.<sup>18</sup> To make matters worse, the corps commanders were often required to make FSCL changes directly with the small Army Battlefield Coordination Element (BCE) (now a Battlefield Coordination Detachment) at the ACC headquarters in Riyadh. There was no standardized time or tempo for calling in these changes. Throughout Operation DESERT STORM, these issues had a significant impact on where the FSCL would be placed and how it would be utilized.

### Period One

The first thirty-eight days of Operation DESERT STORM primarily focused on the achievement of ACC objectives. From 17 January to 23 February, air forces were also tasked to destroy Republican Guard forces in order to decrease their strength to approximately fifty percent in preparation for the land offensive.<sup>19</sup> During this period, VII Corps forces deployed and prepared for the forthcoming land offensive while defending along the Saudi border.

In terms of employment, ACC forces constituted the preponderance of forces throughout the JOA. ACC assets from the USAF, including the A-10, AC-130, F-15E, F-16, F-111, F-117 and B-52 aircraft, performed numerous counterair, strategic attack, and AI (now a subset of counterland) missions. During the Battle of Khafji, ACC forces also provided CAS to the LCC. LCC forces had limited participation in this period with AH-64 Apache and field artillery (FA) forces conducting occasional raids and feints in support of the ACC and in preparation for the land offensive.<sup>20</sup> In addition, USA forces launched thirty-two Army tactical missiles in support of both ACC and LCC objectives, but in the enormity of the ongoing air operations, they went "largely unnoticed."<sup>21</sup>

During Period One, the FSCL was established at the berm along the northern Saudi Arabian border.<sup>22</sup> Due to the limited land force involvement in offensive operations for the period, the actual FSCL location corresponds to a preponderance of force FSCL location. When LCC participation did occur, land forces either instituted and coordinated a temporary adjustment to the FSCL or, when providing short-notice indirect fire beyond the berm, coordinated directly



with the ACC C2 elements. This usually entailed LCC fires being annotated, scheduled, or flowed into the ACC's air tasking mechanism.<sup>23</sup>

Based on post-DESERT STORM AARs, FSCL placement and use did not appear to hinder joint operations.<sup>24</sup> The limited raids and artillery action were effectively integrated with air force operations, which carried the weight of the Coalition offensive operations. In addition to several firings by the newly fielded ATACMS, LCC operations included a highly successful AH-64 raid in support of the ACC objective to destroy Iraqi C2 capabilities.<sup>25</sup> However, ARCENT ATACMS units reported some lost opportunities to engage time-critical high payoff targets (HPTs), with coordination times often taking between thirty minutes and two hours.<sup>26</sup>

The only significant land combat that did occur in Period One was during the Battle of Khafji. This battle allows for the analysis of FSCL placement in a defensive operation. On the night of 29 January, three divisions from the Iraqi III Corps launched toward the town of Al Khafji near the Saudi border.<sup>27</sup> The Iraqi objectives were to seize the initiative, cause Coalition casualties, and start the ground war prematurely.<sup>28</sup> The Coalition would defend Saudi Arabia by denying and containing any enemy penetration. Although US Army participation in the battle was limited, US Marines under the control of the LCC fought in the battle and their ground parties directed ACC firepower. USAF forces under ACC control, including A-10, F-16 and AC-130 gunships, flew 267 AI and CAS sorties. These sorties accounted for approximately 300 enemy vehicles destroyed, including 90 Iraqi tanks and armored personnel carriers (APCs).<sup>29</sup>

According to one postwar independent analysis, the battle showed that "airpower can provide the heavy punch needed to stop enemy armored thrusts dead in their tracks."<sup>30</sup> More significant to an analysis of the preponderance of force, the sorties flown during this battle accounted for only seventeen percent of the ACC's 1568 AI missions applying firepower in the KTO.<sup>31</sup> Unfortunately, reports detail several incidents of fratricide, including two during air-to-ground attacks, but FSCL placement was not pertinent to these incidents.<sup>32</sup> The Marines, with limited deep attack assets apart from airpower, maximized the use of CAS and were heavily supported by AI. Clearly, the Battle of Khafji provides evidence that when LCC forces are in defensive operations with limited firepower available, the FSCL should be placed as close as practical to friendly positions. At Khafji, the actual and preponderance of force FSCLs coincided here.

As the ground offensive approached, the VII Corps commander expressed concern that insufficient AI efforts were focused on the artillery in range of the border crossing points.<sup>33</sup> ARCENT leadership wanted the enemy artillery capable of reaching the breach areas reduced by ninety percent.<sup>34</sup> There were perceptions that the targeting priorities did not sufficiently support the impending land offensive. On 26 January, General Schwarzkopf, confident that a successful breach would occur, rejected this view.<sup>35</sup> Other targeting concerns beyond the scope of this analysis were addressed without an impact on FSCL location and ACC focus continued to shift towards facilitating an effective land penetration.<sup>36</sup>

For Period One, FSCL placement had a positive impact on joint operations, assessed as very effective. AARs and postwar project studies tend

to support this assessment. Additionally, the success of breaching operations and indications that the enemy was unprepared and unable to mount effective resistance to the coalition land offensive provide the basis for this assertion.<sup>37</sup> In general, actual FSCL placement coincided with a preponderance of force FSCL placement. Obviously, the analysis of joint employment in Period One is significantly simplified by the imbalance of joint force participation, which heavily favored the ACC.

### Period Two

Period Two analysis begins with Coalition forces commencing sustained offensive operations. Due to the extreme rate of advance in the 100-hour land offensive, analysis for this period focuses on FSCL use and operations against Iraqi units considered capable of mounting a credible defense. Based on objectives assigned by the JFC, Lieutenant General Frederick M. Franks, Jr., Commander, VII Combined Corps, tasked his unit with the following mission statement:

On order, VII Combined Corps attacks to envelop and penetrate Iraqi defenses and destroy the Republican Guard Forces in zone; be prepared to defend northern Kuwait border to prevent re-seizing Kuwait.<sup>38</sup>

Corps objectives were to close with these units and destroy them as well as cut-off their retreat into Iraq.<sup>39</sup> Accordingly, the first days of the land offensive operations were focused on breaching the enemy lines, penetrating through the forward Iraqi forces, and conducting movement to contact the Republican Guards Divisions. Within the KTO, the ACC often played a supporting role, supplying

CAS sorties and focusing AI missions on the enemy ground units adjacent to the advance. The VII Corps zone contained the most prepared and well defended Iraqi positions.

In addition to the large number of armored vehicles which clearly provided the preponderance of forces to close operations within several kilometers of the FLOT, LCC deep fight forces in the VII Corps zone consisted of attack helicopters from an aviation brigade and FA forces, including numerous artillery cannons and ten MLRS batteries.<sup>40</sup> A limited number of ARCENT ATACMS were available to support corps operations. USAF aircraft operating in the VII Corps zone included the A-10, F-16, F-111, and B-52 aircraft flying AI and CAS missions.<sup>41</sup>

For Period Two, a preponderance of force FSCL in the VII Corps zone would have generally equated to the maximum employment range of MLRS, about 15 to 25 km beyond the FLOT. In addition to the vast FA fire support at and inside this range, attack helicopter operations and CAS under the tactical control of the LCC provided this preponderance of force.<sup>42</sup> Beyond this range, AI assets heavily outnumbered the limited ATACMS available to support corps operations. Company-sized elements of attack helicopters occasionally operated beyond this preponderance range, striking 50 to 60 km beyond the FLOT at one point.<sup>43</sup> However, the majority of this LCC firepower was employed inside of a 25 km range.

During the initial land offensive, the Corps generally placed the FSCL at the range of organic artillery assets, approximately 25 to 35 km beyond the FLOT.<sup>44</sup> The Corps adjusted the FSCL, on average, every 12 hours and

established it deep enough to facilitate the next twelve-hour window's advancing land maneuver.<sup>45</sup> The VII Corps staff developed and employed a series of "on order" FSCLs (preplanned and precoordinated with the other forces) corresponding to Corps phase lines which ensured the line could be moved before it inhibited land force maneuver and organic fire support.<sup>46</sup>

Based on AARs, actual FSCL placement in this period enhanced joint operations and mission success. The rapid advance did result in an accordion effect, where a new FSCL location would be initially be deeper than optimal and, as land forces advanced, become closer than optimal. According to one review, "expeditious attack of HPTs [by AI] beyond the FSCL continued to have a major impact on the ability and desire of Iraqi forces to come out of their holes.... [However,] corps began to push the FSCL farther out to facilitate both current and future operations."<sup>47</sup> Other participants reported that the FSCL in this period effectively balanced the land force maneuver space requirements with AI mission facilitation.<sup>48</sup>

In Period Two, the close combat skills of the US Army were clearly tested in action such as the fabled "Battle of 73 Easting." Demonstrating success in the extreme, the 2d Armored Cavalry Regiment of VII Corps attacked elements of the Republican Guards' elite Tawakalna Division. The defending Iraqi commander later remarked that after losing two of thirty-nine T-72 tanks in the five week air assault, the 2d Cavalry had "annihilated his entire command in fewer than six minutes."<sup>49</sup> The better US equipment and training proved to consistently pay-off in the conflict's close operations.

Success in the close fight is usually dependent on a successful deep fight. "Shaping of the battlefield" was under the joint direction of the LCC and ACC. Unfortunately, the AARs note several times when ATACMS missions were inhibited by delays in coordinating attacks on targets long of the FSCL. As a typical example, one brigade fire support officer reported, "Firing beyond the FSCL was painful/difficult to get permission."<sup>50</sup> Whether ACC assets serviced these intended targets is unknown.

Time delays in the ACC's air tasking order (ATO) planning cycle exacerbated perceptions that the FSCL was effectively a fire support "wall" to long range LCC fires. Highly mobile land operations made target planning projections difficult forty-eight hours prior to execution, when the ACC's staff would begin their planning and tasking process. Although fires beyond the FSCL could be flowed into the current and implemented ATO, the volume of operations and the C2 mechanisms of the era required time to accomplish it, often in excess of thirty minutes. This was considered unacceptable to the forces attempting to employ LCC deep assets against fleeting mobile targets.<sup>51</sup> However, land forces in this situation were not normally in direct peril from these deep HPTs, as would be the case in targeting a scud loaded with a chemical warhead. The targets did not represent an immediate threat and the doctrinal provision relating that the "inability to coordinate will not preclude firing" was not utilized.<sup>52</sup> Proper firing discipline on the part of the operators contributed to the absence of surface-to-air fratricide incidents with numerous Coalition forces operating in the JOA long of the FSCL.

In Period Two, there were also increasing “beyond the FSCL” targeting issues in which the VII Corps commander perceived too little say in the deep fight and AI targeting plan.<sup>53</sup> General Franks had deployed from the European AOR and was used to a distribution of BAI. He did not feel the joint targeting board offered a satisfactory means to determine target priorities within the VII Corps zone.<sup>54</sup> However, an analysis of AARs relates a different perspective. One report stated “continued air attack of targets over the FSCL were directed...reducing a unit forming to attack the VII Corps by 80 percent before it could get into action.”<sup>55</sup>

From the perspective of the ACC, coordination and movement of the FSCL started to become an issue in Period Two. As the four corps began the transition to the offense, the FSCL moved with little consistency as to when or where. The fluid nature of the tactical land battle and the limited LCC oversight in FSCL matters contributed to this dilemma.<sup>56</sup> There was a distinct tradeoff between a close FSCL moving often and a deep FSCL moving infrequently. In all, the C2 mechanisms utilized at the time appear to support the requirement for moving the FSCL at twelve hour intervals and placing it at an average depth of the organic fire support for the time period.

For Period Two, actual FSCL placement tended to match a location based on the preponderance of forces. An analysis of the period’s results and AARs reveals that joint operations were somewhat effective. Establishing the FSCL closer could hinder AH-64 and FA attacks on time-critical targets due to coordination delays. Moving the FSCL deeper would limit AI effectiveness in

shaping the battlefield for the close fight, constraining it to the more distant targets. Regardless of the source, deep firepower enabled LCC forces to close with and destroy enemy forces that the VII Corps encountered in zone.<sup>57</sup> The Iraqi forces soon realized a retreat out of the KTO was their only reasonable option.

### Period Three

The final days of the Operation DESERT STORM land offensive fully focused on the destruction and defeat of the Republican Guards forces.<sup>58</sup> As the maneuver forces made contact, enemy action would determine the means of this destruction. In the event the Iraqi forces attempted to withdraw, "massive CAS and AI, AH-64 cross-FLOT operations and artillery fires" would be key.<sup>59</sup> For this analysis, Period Three begins when the Iraqi forces began to withdraw in earnest and General Schwarzkopf ordered the VII Corps to "shut the back door at all costs."<sup>60</sup> During this period, Certain Victory relates that adverse weather became a problem and the CINC could not count on airpower to put the "cork in the KTO bottle."<sup>61</sup> The Coalition fought during the region's worst weather in fourteen years and, making matters worse, massive oil well fires severely restricted visibility within the KTO.<sup>62</sup>

Even though the enemy was withdrawing during this period, VII Corps armored forces continued to see some significant resistance in close operations. Forward movement of the advance shifted eastward as these forces began to flank Iraqi units occupying central Kuwait. For the deep fight, VII Corps



extensively employed MLRS and elements of the aviation brigade, which attacked deep into the KTO on 26 and 27 February.<sup>63</sup> USAF A-10, F-15E, F-16 and F-111 aircraft flew CAS and AI in the VII Corps zone. However, the poor weather limited medium altitude operations throughout the region and the low visibility caused by the burning oil wells within Kuwait also degraded airpower effectiveness. The impact on CAS, which typically requires visual identification of friendly forces in close proximity to the targets, was significant.<sup>64</sup> Air interdiction effectiveness within Kuwait was also degraded, as most of the weapons and targeting systems employed at the time did not have good precision capability when employed in the poor weather.

In light of these factors, the preponderance of force FSCL in the VII Corps zone would not have been situated parallel to the FLOT but generally along the Kuwait-Iraq northern border from beyond Corps' close fight out to the Persian Gulf. This was somewhat perpendicular to the advancing Coalition forces. North of the border, the ACC generally provided the preponderance of forces beyond the close fight and the range of artillery systems organic to the corps, approximately 15 km past the northern FLOT. South of the border where the visibility was poor, the LCC generally provided the preponderance of forces out to the coast, especially during several multi-battalion attack helicopter deep operations, beginning on the night of 26 February.<sup>65</sup> Figure 5 shows a diagram conveying this preponderance of force FSCL in the VII Corps zone.

On 26 February, LCC forces attempted to extend the depth of aviation operations and FA fires, including ATACMS, to engage the withdrawing enemy.

Frustration with a FSCL closer than this depth is evident in AARs. For example, one artillery officer stated, "In one instance, the battalion was passed 10 targets while moving and told to fire when within range. Closing into position, 1-27 FA [MLRS] reported ready to fire with eight of the ten targets in range and received instructions to stand by for airspace coordination. After waiting more than an hour, clearance was granted to fire on only two of the targets."<sup>66</sup> The lack of airpower presence in the KTO, which was often diverted north due to the poor weather, and the success of aviation attacks fueled consideration to place the FSCL northeast of the Euphrates River, beyond the forward limit of the land maneuver scheme.

### Operation DESERT STORM AO, VII Corps Period Three: 27 February

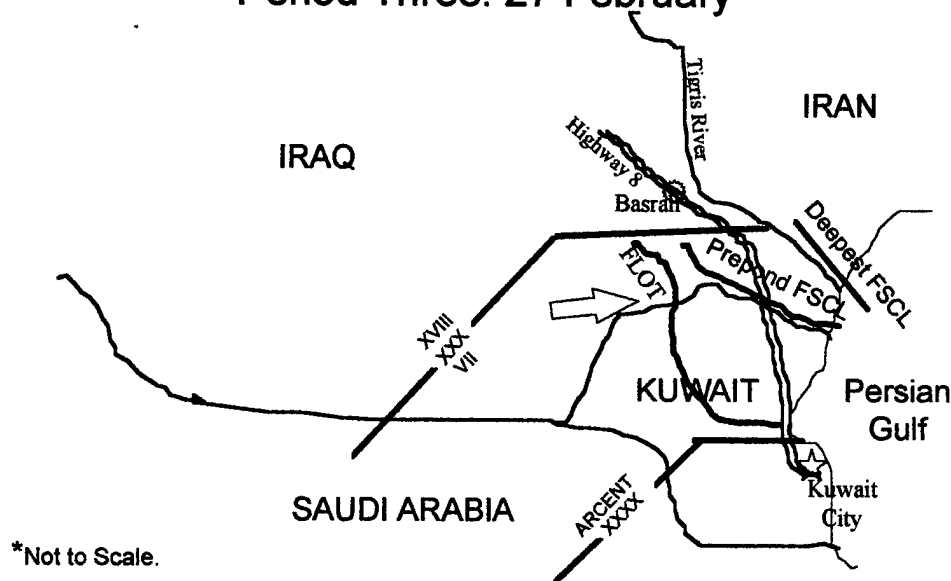


Figure 5: Based on figure 5-5 of Certain Victory.<sup>67</sup>

Brigadier General Robert H. Scales, Director of the Desert Storm Study

Project provides more detail regarding the night of 26 February:

The Air Force attacked the area east of the 20 grid line with a series of single FB-111 strikes [probably strikes by formations of F-11F aircraft], where each dropped four 2,000-pound laser-guided bombs approximately every 20 minutes....If every bomb hit a vehicle, only 12 of several thousand would be knocked out each hour....Just one battalion strike with 18 Apaches could kill more than 100 vehicles in half an hour. Unfortunately...ARCENT could not portray to CENTCOM how successful Franks' deep attack had been and how devastating a strike east of the 20 grid line would have been.<sup>68</sup>

General Scales clearly contends that the air forces' "rather porous gauntlet" along Highway 8 from Kuwait City to Basrah directly led to the escape of the Republican Guards.<sup>69</sup> In the context of the thesis, this assertion brings into question where ownership of the preponderance of force occurred, in terms of combat power. Along Highway 8 within the KTO, about 60 to 90 km beyond the FLOT on the 26th, attack helicopters could have been the dominant and, accordingly, preponderant force. A FSCL beyond this depth could have facilitated their successful employment, especially during periods of their attacks on target. Of course, this might have been unnecessary with proper cross-FSCL coordination of the AH-64 operations, even when considering the limited C2 and communications capabilities in service.

Lieutenant Colonel Jim Green, an A-10 squadron commander, provided an air perspective of operations that occurred north of the KTO, where the burning oils wells did not obscure air-to-surface visibility:

[My formation headed north to] Basrah, to the highway along the Euphrates River where a convoy of about two hundred vehicles--mostly tanks--were trying to escape. When we got there it was like a feeding frenzy with A-10s, F-16s and F/A-18s all trying to get in to destroy that

convoy. I ended up orchestrating the affair since we were beyond the army and the ground FACs. The Iraqi guys jumped out of their vehicles and ran while the mix of planes in the area just systematically decimated that column.<sup>70</sup>

Neither perspective refutes the case for preponderance but merely asserts ownership of the preponderant force at a given location. These excerpts clearly imply that ownership of the preponderance of forces is critical in the assigning of FSCMs, and at issue is where this ownership occurs, be it at 5, 25, or 75 km beyond the FLOT. In any case, the FSCL "wall," as perceived in the VII Corps' zone, put significant limits on the employment of deep attack assets and inhibited the destruction of the enemy.

On 27 February, the VII Corps placed its FSCL well ahead of its FLOT across the zone. This action was taken throughout the ARCENT AO, coordinated by and with adjacent forces to the northwest. There, the XVIII Airborne Corps wanted to establish a significantly deeper FSCL, but with a different mission, deep attack assets, and less enemy resistance. Although beyond the scope of this analysis, these differences would affect the location of the preponderance of force FSCL.<sup>71</sup> The Corps commanders took this action to enhance the perceived ability to shape deep operations in zone. By controlling all available CAS sorties, which were any sorties inside the FSCL by CENTCOM's construct, the VII Corps Commander felt the deep attack targeting plan would be more receptive to the corps' inputs and needs. This placement would also minimize coordination problems in the deep employment of the AH-64. According to Major Zook's FSCL analysis, "The Iraqi forces were well beyond the range of

organic corps assets and it was impossible to get eyes on the target.”<sup>72</sup> Coalition aircraft, “the most effective and capable system for this destruction,” were forced to operate under CAS rules. The result was an escape of fifty to sixty percent of the Republican Guard divisions with joint firepower inhibited, not coordinated.<sup>73</sup>

Analysis accomplished by the Independent Research and Information Services (IRIS) Corporation tends to confirm this, accusing the VII Corps Commander of overly restricting air component operations. “By placing the FSCL north of the Euphrates river, neither organic land fires nor available air assets could be brought to bear.”<sup>74</sup> This excessively deep FSCL created a sanctuary between the maximum range of the corps FA assets and the FSCL. All sorties could not attack inside the FSCL and the land elements to control CAS sorties were not in position to direct employment.

The resulting safe haven allowed the Iraqi forces to withdraw into Iraq, unhindered by air or land fires.<sup>75</sup> A significant number of these waited for the cessation of hostilities within the city of Basrah, not targeted due to concerns of collateral damage to civilians.<sup>76</sup> In all, one mechanized and two armored Iraqi Republican Guards divisions were able to flee through the area, successfully avoiding the LCC’s scheme of maneuver.<sup>77</sup> The result was directly detrimental to the achievement of JFC objectives.<sup>78</sup>

The deep fight which offered a significant means to delay, disrupt as well as destroy the withdrawing enemy, was unsuccessful and the land maneuver forces were never afforded the opportunity to close with and cause their total defeat. Clouding the debate are assertions that the ACC established the deep

FSCL on the twenty-seventh.<sup>79</sup> General Horner, the ACC, stated that confusion arose when he coordinated through the BCE to have the FSCL moved closer to the FLOT in the XVIII Corps zone. Forces here encountered less enemy resistance in the close fight but more difficult terrain, slowing their advance. This FSCL placement did not inhibit those forces from attacking into the western flank of the retreating army while allowing airpower to continue to attack enemy forces near Basrah.<sup>80</sup>

For Period Three, analysis focused on FSCL placement in the context of rapidly advancing ground forces and withdrawing enemy forces. Degradation of effectiveness generally occurred when actual FSCL placement was different than a location based on the preponderance of forces. Of course, this does not provide overwhelming proof that an FSCL based on the preponderance of forces, as presented in figure 5, would yield the optimal results. Overall, inhibitions to joint employment and attack on the retreating Republican Guards forces contributed to their escape. ACC efforts, which were directed at delaying and disrupting, as well as destroying these forces, were somewhat unsuccessful. Land deep attack assets were constrained by range, limited numbers, and misapplied FSCMs while the close fight forces were unable to close with and destroy the enemy in retreat prior to the cease-fire. Therefore, joint effectiveness for the period is rated as ineffective. The JFC objective to destroy the Republican Guards Forces in the KTO, which would deny future offensive capability to the enemy, was not accomplished.

Although VII Corps did not complete the envelopment prior to the cease-fire, significant and lasting damage was inflicted on Iraq's elite fighting force. Focusing analysis strictly on FSCL placement risks the potential of oversimplifying the problems Coalition forces faced. Other analyses make cases that the LCC scheme of maneuver was not fully communicated or understood and effectively implemented by several subordinate commanders ("to cut off" versus "to push out" the enemy), and that an outcry over the "Highway of Death" and an early cease-fire decision facilitated the Republican Guards' escape.<sup>81</sup> However, this analysis shows that shortcomings in FSCM applications were a detrimental factor.

### Summary

The effect of FSCL placement on joint employment success is presented in table 1. The table depicts initial joint success, especially in Period One, where the actual FSCL closely matched a preponderance of force FSCL with Coalition forces in the defense. A decline in joint effectiveness is consistent with a decline in correlation of FSCL placement to the preponderance of forces, lending credence to the thesis assertion. In Period Three, where forces attacked a withdrawing enemy, analysis highlights problems with FSCL placement and operational success.

Of course, after-the-fact analysis used to determine the most appropriate FSCL placement does not necessarily help the staffs planning future operations. The next chapter attempts to establish and assess the potential of a

preponderance of force FSCL useful in the planning of operations and course of action development.

Table 1. Correlation of Preponderance of Force FSCL to Joint Effectiveness

## "Preponderance" FSCL Analysis

Actual/Preponderance FSCL Coincident?		Joint Employment Effectiveness:	
Yes /Some/ No		Ineffective/ Effective /Very Effective	
Period I:	X		X
Period II:	X	X	
Period III:	X	X	

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<sup>1</sup> "JULLS Lessons Learned--Operation Desert Storm, 1992," On-line. Internet, 24 February 1998, Available from [http://www.dtic.dla.mil/gulfink/db/army/080596\\_jun96\\_declas\\_17\\_0001.html](http://www.dtic.dla.mil/gulfink/db/army/080596_jun96_declas_17_0001.html).

<sup>2</sup> Department of Defense, Conduct of the Persian Gulf Conflict: An Interim Report to Congress (Washington, DC: Department of Defense, 1991), 2-3.

<sup>3</sup> Charles Horner, General, USAF (Retired), Operation DESERT STORM JFACC, telephone interview by author, Leavenworth, KS, 1 February, 1998.

<sup>4</sup> Robert H. Scales, Jr., Brigadier General, USA, Certain Victory: The US Army in the Gulf War (Fort Leavenworth, KS: US Army Command and General Staff College Press, 1994), 106.

<sup>5</sup> Michael J. Barbee, Major, USA, "Minimizing Coordination Problems Between the JFACC and JFLCC in the Coordination of Joint Fires Between the



FSCCL and Land Component Forward Boundary" (MMAS thesis, US Army Command and General Staff College, Fort Leavenworth, KS, 1997), 48.

<sup>6</sup> Barbee, 25.

<sup>7</sup> David H. Zook, Major, USA, "The Fire Support Coordination Line: Is it Time to Reconsider Our Doctrine?" (MMAS thesis, US Army Command and General Staff College, Fort Leavenworth, KS, 1992), 114.

<sup>8</sup> Ibid., 4.

<sup>9</sup> Horner interview.

<sup>10</sup> Ibid.

<sup>11</sup> Zook, 116.

<sup>12</sup> Horner interview.

<sup>13</sup> Barbee, 14.

<sup>14</sup> Scales, 140-141.

<sup>15</sup> Horner interview.

<sup>16</sup> Ibid.

<sup>17</sup> Barbee, 47.

<sup>18</sup> Horner interview.

<sup>19</sup> Zook, 113.

<sup>20</sup> Scales, 200-204.

<sup>21</sup> Ibid., 369.

<sup>22</sup> Zook, 114.

<sup>23</sup> Ibid.

<sup>24</sup> Ibid., 116.

<sup>25</sup> Scales, 107.

<sup>26</sup> Zook, 117.

<sup>27</sup> Independent Research and Information Services (IRIS) Corporation, "Airpower and the Iraqi Offensive at Khafji," On-line. Internet, 24 February 1998, Available from <http://www.irisresearch.com/khafji.html>.

<sup>28</sup> Ibid.

<sup>29</sup> Ibid.

<sup>30</sup> Ibid.

<sup>31</sup> Ibid.

<sup>32</sup> Thomas A. Kearney and Eliot A. Cohen, Gulf War Air Survey Summary Report (Washington, DC: US Government Printing Office, 1993), 20.

<sup>33</sup> Zook, 124.

<sup>34</sup> Scales, 178.

<sup>35</sup> Ibid., 180.

<sup>36</sup> Zook, 125.

<sup>37</sup> Ibid., 126.

<sup>38</sup> Ibid., 101.

<sup>39</sup> Ibid., 102-103.

<sup>40</sup> Scales, 226.

<sup>41</sup> Horner interview.

<sup>42</sup> Zook, 129-131.

<sup>43</sup> Scales, 243.

<sup>44</sup> Zook, 127-128.

<sup>45</sup> Ibid., 169.

<sup>46</sup> Zook, 127.

<sup>47</sup> Zook, 130-131.

<sup>48</sup> Ibid., 131.

<sup>49</sup> Scales, 262.

<sup>50</sup> Zook, 6.

<sup>51</sup> Barbee, 50.

<sup>52</sup> US Department of Defense, Joint Chiefs of Staff Publication 3-0, Doctrine for Joint Operations (Washington, DC: Office of the Joint Chiefs of Staff, 1995), III-34.

<sup>53</sup> Barbee, 13.

<sup>54</sup> Ibid., 50.

<sup>55</sup> Zook, 138.

<sup>56</sup> Horner interview.

<sup>57</sup> Scales, 244-245.

<sup>58</sup> Zook, 132.

<sup>59</sup> Ibid.

<sup>60</sup> Scales, 252.

<sup>61</sup> Ibid.

<sup>62</sup> Kearney, 171.

<sup>63</sup> Scales, 287-291.

<sup>64</sup> Kearney, 172.

<sup>65</sup> Ibid., 112.

<sup>66</sup> Mark S. Jensen, "MLRS in Desert Storm," Field Artillery (August 1991): 33.

<sup>67</sup> Scales, based on the diagram and details in Certain Victory, Figure 5-5.

<sup>68</sup> Scales, 290.

<sup>69</sup> Ibid., 315.

<sup>70</sup> William L. Smallwood, Warthog, Flying the A-10 in the Gulf War (New York: Macmillan Publishing Company, 1993), 204.

<sup>71</sup> Rebecca Grant, Doctor, "The Origins of the Deep Attack Weapons Mix Study," IRIS, On-line. Internet, 23 February 1998, Available from <http://www.irisresearch.com/dawns2.html>.

<sup>72</sup> Zook, 4.

<sup>73</sup> Ibid., 3-4.

<sup>74</sup> Ibid.

<sup>75</sup> Ibid., 141.

<sup>76</sup> Kearney, 115.

<sup>77</sup> Grant.

<sup>78</sup> Ibid.

<sup>79</sup> Zook, 3.

<sup>80</sup> Horner.

<sup>81</sup> Kearney, 156.

## CHAPTER FIVE

### CONCEPTUAL ANALYSIS

Chapter 5 provides a preponderance of force FSCL analysis in the context of Prairie Warrior 98. With Army sponsorship and Air Force participation, analysis allows for topic review with consideration of the most current doctrine and updated FSCM applications.

PW 98 combat occurs in Pacifica, a fictional archipelago nation based on the terrain of the Philippines and with LCC action on the island of Luzon.<sup>1</sup> The US Army is tasked to participate in this “major regional contingency” with a three-division corps while the US Air Force provides forces from four air expeditionary wings. The II Corps Operations Plan (OPLAN) 98-1, PACIFIC THUNDER, details four phases consisting of deployment, enforcement of an exclusion zone, decisive combat, and redeployment operations.<sup>2</sup> The applicable CINC objectives are to “conduct a rapid [land] offensive to destroy or compel SURRANIAN [enemy] withdrawal from Pacifica” and to “destroy SURRANIAN ability to project military power.”<sup>3</sup>

The II Corps Commander is the designated LCC, providing the following mission statement: “II Corps deploys to compel Surranian withdrawal from Luzon. On order attacks to destroy Surranian and PRA forces in the Luzon AO in order to facilitate rapid establishment of civilian authority and promote stability in the

region.”<sup>4</sup> FSCL analysis focuses on the decisive combat operations in Phase IIIb, when the 4th Mechanized Infantry Division (4 ID), the LCC’s main effort, “attacks in zone to destroy the [Surrean] 5th Marine Division in northern Luzon,” the identified enemy center of gravity.<sup>5</sup> Within the scope of this analysis, the LCC scheme of maneuver for Phase IIIb is straightforward. Terrain in the region dictates a frontal assault from south to north in the central valley of the island.

### Fire Support Coordination Issues

PW 98 Phase IIIb is similar to Period Two in the analysis of Operation DESERT STORM, with land forces conducting high tempo offensive operations and attacking into a capable and prepared defending enemy. Unlike operations in the Gulf War, the PW 98 scenario puts significant limits on airpower involvement in the initial phases of the PACIFIC THUNDER. Due to political constraints, no air campaign or preparation of the battlefield will occur prior to the initiation of land offensive operations. At this point, a major portion of ACC forces will focus on gaining and maintaining air superiority.<sup>6</sup> The limited ACC counterland involvement must be appropriately accounted for in the LCC’s employment of forces and in the application of FSCMs.

The LCC’s AO is extensive, spanning the majority of the island of Luzon and approximately 400 km deep and 200 km wide. Within this AO, the 12th Air Force Commander, designated the ACC for PACIFIC THUNDER, is tasked to support the LCC with AI and CAS.<sup>7</sup> The ACC is assigned “all airspace within the JOA” and is initially designated a non doctrinal terrain-based AO north of the LCC

AO.<sup>8</sup> A line referred to as “the LCC/ACC boundary” delineates the AOs and, for analysis purposes, is referred to as the LCC AO forward boundary. Corps planners intend to advance this line northward during land offensive operations until the LCC AO encompasses the entire island.<sup>9</sup> Beyond this boundary, AI missions support the ACC. Regarding command relationships, the ACC is designated the airspace control authority and “the coordinating authority for all air operations and deep fires in the JOA.” In the context of this analysis, the FSCL provides delineation of coordinating authority. Figure 6 presents a diagram of the PW 98 construct, including FSCL application.

## PW 98 AO Construct

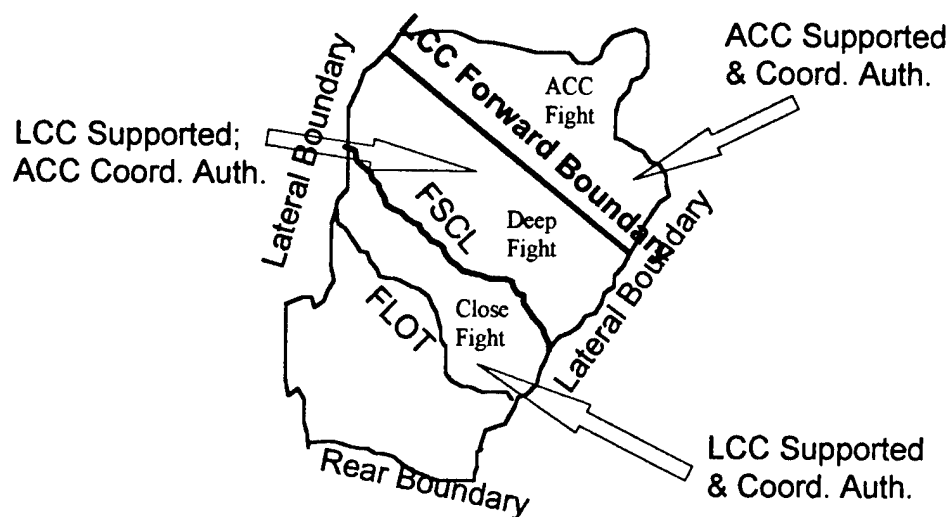


Figure 6

Based on previous exercises and the II Corps OPLAN, analysis implies and assumes the following FSCM guidance. The ACC is tasked to coordinate and deconflict strikes beyond the FSCL in the LCC AO. Except when "exceptional circumstances" preclude, the LCC must coordinate fires into this area. The JFC provides guidance on exceptional circumstances, allowing that the inability to conduct normal coordination will not preclude the attack of "high-priority targets" beyond the FSCL. High-priority targets are identified as those of such value or potential danger to friendly forces that the risk of fratricide or dual engagement is acceptable, such as weapons of mass destruction.<sup>10</sup>

Per OPLAN guidance, the LCC establishes and adjusts the FSCL under the purview of the JFC and does not delegate this task to subordinate echelons. Projected FSCL adjustments will utilize a series of "on order" phase lines.<sup>11</sup> Although the 4 ID possesses advanced digital C2 systems capable of communicating FSCL changes rapidly and efficiently, lack of connectivity with other "nondigitized" units limits this futuristic capability. Analysis assumes FSCL changes must account for coordination delays of at least two hours and likely requiring four hours prior notice. FSCL placement must account for friendly advances during this time.

The PW 98 targeting process follows guidance contained in Joint Pub 3.56.1, Command and Control for Joint Air Operations. JFC guidance and objectives are integrated into a master air attack plan, which is used in the production of the ACC's ATO. This plan addresses target priorities and details target locations for all forces operating in JOA airspace, such as ACC forces,



LCC ATACMS and aviation forces, and Tomahawk Land Attack Missiles (TLAMs).<sup>12</sup> Analysis utilizes the air attack plan to determine where LCC and ACC deep forces expect to employ on the enemy. The Corps OPLAN discusses procedures for use in the nomination of LCC targets and provides guidance for planning the employment of systems like ATACMS for inclusion on the ACC's ATO.<sup>13</sup>

PW 98 provides a valid construct for thesis analysis. Research subordinate questions two through five guide further analysis. Question two is, What are the number and type of LCC forces participating in the AO and what are their projected employment locations and depths?

#### LCC Forces and Employment in PW 98

Forces provided to the LCC from the US Army include a light infantry division, an air assault division and the 4 ID, which is an advanced mechanized infantry division equipped with projected Force XXI systems and future capabilities. Providing additional LCC firepower from II Corps are an armored cavalry regiment, two aviation brigades, and significant Corps artillery elements.

LCC force analysis begins with a review of the armored systems providing maneuver and direct fire on the enemy. The M1 tank, equipped with a 120-millimeter (mm) gun, fires to a maximum effective range of 2.5 km.<sup>14</sup> The M2 and M3 armored vehicles carry seven to twelve tube-launched, optically tracked, wire-guided heavy antitank missiles (TOW) with a maximum firing range of 3.8 km.<sup>15</sup> Individual soldiers and dismounted infantry also employ the TOW system.<sup>16</sup> For

Phase III operations, the vast number of these direct fire systems provide the LCC with the preponderance of forces within 4 km of the FLOT.

Mortar systems provide a primary means of fire support to the maneuver forces along the FLOT. Tube sizes vary from 60-mm to 120-mm with their maximum employment ranges increasing from 3.5 km to 7.5 km.<sup>17</sup> Mortars are most effective against lightly protected personnel with inherently limited accuracy and weapons effects. Organic to and controlled directly by the maneuver units, coordination of these indirect fire weapons above the tactical level is impractical.<sup>18</sup> To avoid conflict with ACC and other LCC forces, FSCMs must account for their employment and maximum trajectory altitude.

The most common deep attack asset within the corps is field artillery cannon. FA Howitzer systems in II Corps have 105-mm and 155-mm tubes that are towed or self-propelled (SP). The systems fire a variety of munitions with maximum ranges between 11 km and 24 km. When firing rocket-assisted projectiles (RAP), maximum range extends to 30 km. There are 108 M109A6 SP "Paladin" systems in the II Corps' two FA brigades, with increased accuracy to 30 km while using RAP.<sup>19</sup> The 4 ID is equipped with fifty-four "Crusader" systems which, in order to limit analysis, is considered to have a capability equivalent to the Paladin.<sup>20</sup>

The MLRS employs to a maximum range of 30 km with a sustained rate of twelve rockets per minute. II Corps has a total of thirty-six MLRS fire units in two battalions with the 4 ID possessing eighteen more.<sup>21</sup> For planning, the Corps staff assumes the rate of supply will equal the anticipated rate of consumption

and transportation assets will be available to move the MLRS batteries when required.<sup>22</sup> Primary missions for the system are counterfire and suppression of enemy air defenses (SEAD).<sup>23</sup> The extended range MLRS is fielded in PW 98 but considered as equivalent in capability to limit the scope of analysis.

Obviously, these systems effectively increase the LCC's ability to provide more forces at greater range and could impact the location of a preponderance-based FSCL.

ATACMS will be extensively employed by II Corps in PW 98 with 224 missiles available. With a maximum employment range of 165 km, the system is optimized to attack soft fixed and semi-fixed targets. Primary missions include attacks on tactical surface-to-surface missiles, air defense systems, C2 systems, and logistics.<sup>24</sup> In the PW 98 scenario, the 4 ID has organic ATACMS but the II Corps Commander retains the authority to fire their sixteen advanced Block II munitions with an assumed range of 165 km (the actual range is classified).<sup>25</sup>

LCC aviation forces include the AH-64 Apache and OH-58D Kiowa Warrior in the II Corps' two aviation brigades. Additionally, the 4 ID possesses a battalion of nine RAH-66 Comanche and fifteen Apache Longbow helicopters in addition to twenty-four Comanche aircraft in the Cavalry Squadron. To simplify analysis, the Comanche and Apache Longbow are considered equivalent to the currently-fielded Apache in determining the preponderance FSCL location. The attack helicopters possess significant firepower, including the Hellfire missile system and 2.75-inch rockets, with a maximum employment range of 8 to 9 km for close fight consideration.<sup>26</sup> For deep operations, aircraft firepower, time on station, and

employment range is dependent on environmental factors. For PW 98, these systems are projected to conduct periodic attacks from forward locations up to 100 km beyond the FLOT with ATACMS providing SEAD protection.<sup>27</sup>

Analysis of the land forces does not include US Marine Corps or coalition combat forces under LCC operational control. These forces provide significant land combat power to the close fight but have a limited effect on the analysis of the preponderance of force FSCL due to limited deep fight capabilities. Additionally, US Marine Corps organic airpower is not considered in the analysis of ACC forces. The next research subordinate question analyzes applicable USAF airpower. Question three is, What are the number and type of ACC forces participating in the AO and what are their projected employment locations and depths?

#### ACC Forces and Employment in PW 98

The USAF contribution to ACC forces includes four air expeditionary wings with 296 fighter and bomber aircraft. Deployed basing and inflight refueling allow all aircraft to operate throughout the Luzon AO. The apportionment of over 600 daily missions throughout Phase III is projected as 50 percent counterair, 20 percent AI, 20 percent CAS, and 10 percent strategic attack.<sup>28</sup> Scenario constraints dictate that a significant amount of combat power be dedicated to counterair tasking with 258 sorties allocated daily. A-10, B-1, B-2, B-52, F-16, F-15E, and F-117 aircraft are allocated to fly over 200 missions against surface

targets in Luzon (AI, Strategic Attack, Offensive Counterair) and over 165 CAS missions daily, with AI taking precedence over CAS.<sup>29</sup>

For simplicity, CAS, flown by primarily by A-10s, is assumed to occur in the land component AO within 15 km of the FLOT under the tactical control of the LCC. Distribution will be prioritized to the 4 ID as the main effort with 30 sorties planned and 40 more available on request, with 165 total daily sorties tasked for the entire force.<sup>30</sup> Strategic attack missions occur in the ACC AO, predominately flown by F-117 and B-2 aircraft.

The primary ACC forces considered for LCC AO preponderance depth are consequently the AI assets. These conduct limited attacks on Luzon, primarily operating in massed strike packages. Typically, B-1 and B-52 aircraft will fly 49 sorties and F-16 and F-15E will fly 45 sorties daily.<sup>31</sup> To keep analysis manageable, the daily sortie rates are used in determining preponderance although the strike package attack windows are as little as thirty minutes. More extensive analysis could further detail preponderance by looking at smaller time periods (such as each hour), noting that ACC forces, like LCC aviation assets, are often significant only for limited periods of time.

Analysis of the ACC forces does not attempt to quantify the magnitude of air-to-ground combat power provided, but acknowledges that these forces will generally employ the variety of precision-guided munitions currently available. The projected systems, including Joint Stand-Off Weapons and Joint Direct Attack Munitions, significantly enhance the ACC's ability to conduct survivable

attacks with significant accuracy and lethality in day, night, and adverse weather conditions.

Analysis excludes consideration of the ACC forces operating above and beyond the LCC AO (predominately conducting other aerospace control operations) in preponderance determination. These forces are numerous and must be considered in determining coordination requirements.

#### Preponderance of Force FSCL Determination

Thesis subordinate question four is, Which component commander controls the preponderance of forces at various depths in a typical AO? In particular, analysis identifies the depth, between the FLOT and the LCC AO forward boundary, at which the preponderance of force changeover occurs. For all projected operations in PW 98, LCC forces engaging in close combat provide preponderance out to the range of the organic 120-mm mortars, approximately 7 km beyond a static FLOT. When considering coordination delays and the advancing maneuver forces, analysis doubles this range to 14 km, assuming an average rate of advance 5 km per hour and the capability to adjust the FSCL hourly if necessary.<sup>32</sup> CAS would also be integrated within this approximate depth.

On the other extreme, the ACC, by default, controls the preponderance of forces in the ACC AO and from the LCC forward boundary inward until reaching the maximum range of ATACMS, typically 150 km beyond the FLOT (dependent on system position relative to the FLOT). AI and strategic attack sorties provide

this preponderance, which is beyond the range of LCC fires and typical attack helicopter operations.

To determine where between these two extremes the preponderance of force changeover occurs, analysis continues at the range of Corps cannon artillery systems, with most 155-mm force applied within 15 km of the FLOT. In consideration of coordination delays during the land offensive, placement of a corresponding preponderance of force FSCL occurs at approximately 25 km past the FLOT. With the limited AI force projections in PW 98 Phase IIIb, the LCC maintains the preponderance of forces to this depth across the breadth of the AO.

The LCC's FA forces employing the RAP-equipped Paladin, Crusader systems and MLRS provide the next forces for consideration. In the central zone, the 4 ID, as the Corps main effort, receives the majority of LCC fire support, including corps Paladin and MLRS direct support. These systems provide significant firepower to approximately 25 km beyond the FLOT, if positioned close to the FLOT and employment at maximum range. These systems provide the LCC with preponderance to 25 km in this zone. The 4 ID possesses advanced digitized C2 systems, eventually facilitating rapid and efficient FSCL coordination and enhancing a rapid advance. However, PW 98 units lack digital connectivity and an FSCL placement 40 km beyond the FLOT appears more practical in accounting for coordination delays during the potential rapid advance.<sup>33</sup>

Whether the LCC maintains a preponderance of force at the 25 to 40 km depth in the zones of the supporting land efforts is questionable. Analysis of the

limited data regarding LCC AI attacks and target locations does not provide a precise determination. If revised and more extensive OPLANs direct the extensive use of airpower in the form of B-1 and B-52 sorties to substitute for a lack of long range artillery, the ACC would control the preponderance. Regardless, the lack of significant enemy defenses and severe terrain correspond to a lack of deep firepower by either component in these zones, making analysis less critical and more difficult.

Attack helicopters conducting deep operations for the LCC are next weighed against the ACC's forces. Based on LCC staff wargaming, Phase IIIb is expected to last about three days (seventy-seven hours). During this time, three attack helicopter battalions are tasked to attack into an engagement area (EA) encompassing the suspected position of the Surranian 5th Marine Division, called EA BISON. With the exception of ATACMS providing SEAD, these are the only LCC forces capable of ranging this EA for the first two days. During these day and night attacks, LCC preponderance depth is not as dependent of FLOT position because, as with ACC forces, the aviation forces have significant flexibility in adjusting their operations range of operations (going from cross-FLOT to relatively deep) to mass combat power. The ability to provide preponderance of force to the LCC will increase as the distance from the FLOT to the EA decreases due to the forward repositioning of ground logistics support and the ability to trade the fuel required to transit with more weapons and increased time on target.



The projected employment of AI in the LCC AO, as conveyed in the Corps OPLAN, provides further insight for AI and attack helicopter comparison. The fire support annex states, "AI plays a critical role in shaping the battlefield by the delaying, disrupting, separating and attriting of enemy forces."<sup>34</sup> The AI priorities for Phase IIIb include the destruction of 5th Surranian Marine Division artillery assets, degrading them by 20 percent to complement attack helicopter and long range artillery fires. The two aviation brigades will conduct attacks such that 70 percent of the artillery assets are destroyed in preparation for the close fight.<sup>35</sup> Successful attacks by the aviation forces in EA BISON facilitate the accomplishment of close operations by the 4 ID, the unit ultimately tasked to close with and destroy the enemy division and compel withdrawal of Surranian forces.

The LCC clearly envisions that attack helicopters will provide the most destructive deep fight force when compared to AI's "complementary" role. Applying this expectation, the LCC provides the preponderance of forces into this EA during attack helicopter operations. A FSCL corresponding to this preponderance could be coordinated and activated during these operations.

The final LCC forces for consideration are ATACMS. The systems organic to the 4 ID as well as reinforcing corps artillery ATACMS are significant. However, the OPLAN tasks assets to conduct SEAD as a primary mission, implying use is triggered by the presence of air forces (although these air forces may be LCC attack aviation). In addition to targeting ADA, weapons of mass destruction and FA radars will be engaged.<sup>36</sup> Projected employment appears

limited to use against high priority targets, probably due to the limited availability and high cost of the munitions. Obviously, these missiles can only be fired once and the number contributing to LCC preponderance will decrease over time accordingly. To employ at maximum range, the projectiles would potentially transit through numerous AI forces. Based on the current plan, the number of ATACMS available and projected for use versus the number of AI assets available tends to favor ACC preponderance during the phase.

A comparison of forces in PW 98 reveals that the LCC possesses a preponderance of forces to a greater depth than was witnessed in Operation DESERT STORM. Particularly in the zone of the 4 ID, the LCC controls the preponderance of forces to the range of MLRS, as presented in figure 7.

#### PW 98 Preponderance of Force FSCL Determination

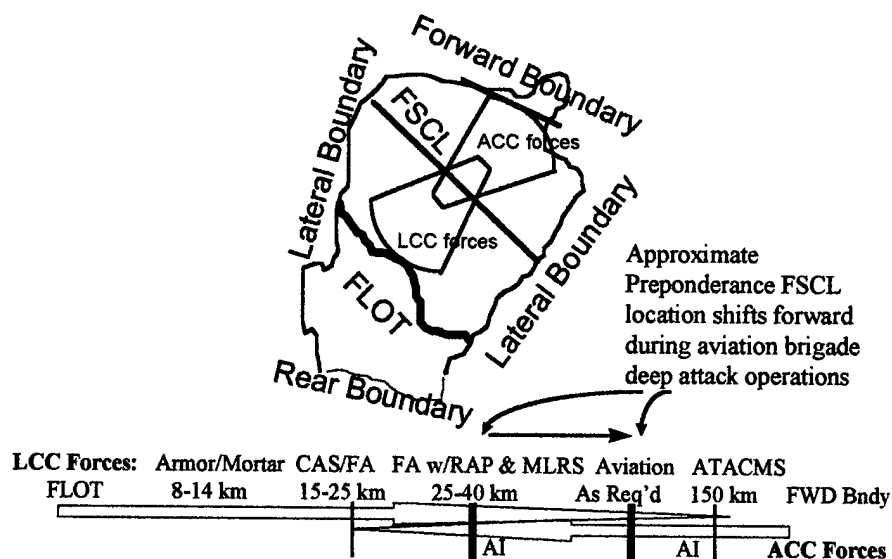


Figure 7

During initiation of deep attacks by the aviation brigades, the preponderance of force FSCL shifts to beyond EA BISON. Consequently, this FSCL depth does not correspond to a set range from the FLOT, but starts at approximately 100 km beyond the FLOT and progressively decreases as the FLOT advances. When aviation attacks are complete, the preponderance of force FSCL reverts back to the 25 to 40 km depth. In simple terms, the aviation attacks make up for the lack of AI in providing firepower to the LCC AO.

#### Preponderance of Force FSCL Analysis and Comparison

The preponderance-based FSCL is compared to other potential FSCL placements to analyze the research design's fifth subordinate question, Does preponderance changeover depth correspond to an appropriate depth for FSCL establishment? The Corps OPLAN contains the following FSCL guidance for Phase IIIb in the coordinating instructions:

On order, the Corps FSCL will be PL Black. On order, during Corps deep aviation attacks Restricted Operation Zone [ROZ] Lighting will be in effect over EA BISON. On order, the Corps FSCL will be PL BLUE [and shift deeper as required to allow for land maneuver].<sup>37</sup>

With the exception of CAS under the tactical control of the LCC, the OPLAN implies that ACC forces do not have a significant role south EA BISON. LCC and ACC firepower were clearly delineated and deconflicted with the FSCL at PL Black.

The nondoctrinal use of a ROZ, which is typically utilized to restrict airspace but not terrain, effectively extends FSCL placement in the 4 ID zone without requiring adjustment in the adjacent zones, which would degrade the

ability of AI to enhance supporting efforts. The application essentially follows the preponderance concept, with the attack helicopters being the preponderant force to the deepest limit of the ROZ. However, use of a ROZ does not account for transit beyond the FSCL, which would require coordination with the ACC anyway, as the airspace coordination authority. This added coordination requirement, which entail ATO interface and enroute communication with ACC C2 elements, makes ROZ use less lucrative. The use of a ROZ when employing aviation assets "on the scene" tends to enhance joint air attack effectiveness as these direct-fire assets can coordinate with CAS assets available to provide more firepower. ROZs established to fire long-range indirect artillery might not be as appropriate.

The II Corps OPLAN application tends to oversimplify coordination issues by minimizing battlespace overlap at the expense of unity of effort. This fire support plan, in particular, tends to inhibit the optimal application of firepower. Unity of effort suffers across the AO as the full variety of air and land-based weapons are generally not available to both sides of the FSCL. For example, targets most vulnerable to blast weapons inside the FSCL may not be serviced by ACC bombs designed to optimize blast effects. Lethal fixed air defense systems beyond the FSCL might not be suppressed by the ATACMS munitions designed for this purpose. Joint employment potentially suffers due to lack of integration.

Based on the OPLAN, the problems appear to occur in the targeting process, before FSCMs are implemented, with planners accounting for target location more than target type in assigning a force against it. The projected fire

support scheme makes a preponderance of force FSCL analysis simplistic. The projected and preponderance of force FSCLs coincide, with the current doctrinal guidance referred to in chapter 2 being followed. A technique of keeping FSCM applications simple is certainly evident. However, joint employment will potentially suffer with limited ACC involvement in the LCC AO. Clearly, difficulties in coordination and joint integration impact joint employment, even in notional exercises.

The current FSCL plan does not support the tempo of operations. With a limited number of potential FSCLs to be adjusted infrequently and across large distances, the fire support plan creates a sanctuary inside the FSCL for the enemy. For excessive periods of time, LCC forces will be unable to engage targets short of the FSCL with sufficient firepower and AI forces will be inhibited from attacking by additional coordination requirements. In all, planned FSCL use is simplistic but tends to correspond to a position based on the preponderance of forces analysis.

There appears to be little need for argument that a FSCL based on the range of organic cannon artillery, at about 15 km, would significantly inhibit the LCC's ability to apply fires and, ultimately, joint employment. In comparison to an FSCL established at the maximum range of LCC fires, analysis indicates a significant degradation of AI effectiveness would occur. Even with the "catastrophic effects" that Certain Victory asserts the ATACMS brings to the fight, lack of numbers limit its utility and the potential indirect employment range present significant liabilities when considering the potential conflict with a number

of ACC forces.<sup>38</sup> Caveats identifying “exceptional circumstances” in the coordination requirements should continue to be utilized to facilitate its short-notice employment beyond the FSCL.

### Summary

Chapter 5 implemented the research design in a notional scenario. PW 98 provided a situation where airpower limitations were offset by extensive deep attack systems under the control of the LCC, implying a deeper preponderance of force FSCL than was witnessed in Operation DESERT STORM. Analysis demonstrated that a preponderance of force FSCL could be determined. In the context of PW 98, this FSCL generally coincided with the projected FSCL.

The Corps OPLAN presented a straightforward and realistic method to achieve JFC objectives. However, it engendered a perception that targeting efforts were focused on the deconfliction of component forces at the expense of unity of joint force effort. Potentially, the plan demonstrates a regression in the orchestration and integration of joint force employment in the effort to keep things simple.

Preponderance of force FSCL determination, in the context of the thesis, proved to be somewhat inexact. Analysis tended to require additional maneuver space to LCC forces as a margin of error for coordination delays. Analysis reinforced the concept that factors specific to the situation (METT-T) dictate where the forces will operate and that determination of the changeover in preponderance of forces provides a means to determine effective FSCL

placement. Unfortunately, time constraints make post-PW 98 analysis unavailable.

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<sup>1</sup> US Army Command and General Staff College, "The Prairie Warrior Homepage," [database on-line] (Fort Leavenworth, KS: Command and General Staff College, 1998, accessed 15 March 1998); available from <http://www-cgsc.army.mil/pw/index.html>.

<sup>2</sup> II Corps Staff (notional), "Operations Plan 98-1, PACIFIC THUNDER," An unpublished presentation (briefing with slides handout) at the US Army Command and General Staff College, Fort Leavenworth, KS, 9 March 1998.

<sup>3</sup> Prairie Warrior Homepage.

<sup>4</sup> II Corps, "Operations Plan 98-1."

<sup>5</sup> Ibid.

<sup>6</sup> Ibid.

<sup>7</sup> Prairie Warrior Homepage.

<sup>8</sup> Ibid.

<sup>9</sup> II Corps, "Operations Plan 98-1."

<sup>10</sup> William S. Knightly, Colonel, USA, "Integrating Joint Doctrine: The FSCCL in the Lantican Theater of Operations," Military Review Volume 76 Number 4 (July-August 1996): 32-33.

<sup>11</sup> II Corps, "Operations Plan 98-1."

<sup>12</sup> Charles C. Floyd, Major, USAF, Air Force Element, US Army Command and General Staff College, interview by author, Fort Leavenworth, KS, 19 March 1998.

<sup>13</sup> 4 Mechanized Infantry Division Staff (notional), "Mission Analysis Brief," an unpublished presentation at the US Army Command and General Staff College, Fort Leavenworth, KS, 16 March 1998.

<sup>14</sup> US Army Command and General Staff College, Student Text 100-3, Battle Book (Fort Leavenworth, KS: US Army Command and General Staff College, 1997), 2-18.

<sup>15</sup> ST 100-3, 2-19.

<sup>16</sup> Ibid.

<sup>17</sup> US Army, Field Manual 6-20-10, Tactics, Techniques, and Procedures for the Targeting Process (Washington, DC: Department of the Army, 1996), B-12.

<sup>18</sup> Ibid.

<sup>19</sup> Ibid.

<sup>20</sup> 4ID, "Mission Analysis Brief."

<sup>21</sup> Ibid.

<sup>22</sup> II Corps, "Operations Plan 98-1."

<sup>23</sup> FM 6-20-10, B-12.

<sup>24</sup> Ibid.

<sup>25</sup> II Corps, "Operations Plan 98-1."

<sup>26</sup> FM 6-20-10, B-13.

<sup>27</sup> II Corps, "Operations Plan 98-1."

<sup>28</sup> Floyd interview.

<sup>29</sup> Ibid.

<sup>30</sup> Ibid.

<sup>31</sup> Ibid.

<sup>32</sup> Planning factors are based on wargaming analysis between H + 20 and H + 80 provided in the Corps Operations Plan 98-1 presentation.

<sup>33</sup> 4ID, "Mission Analysis Brief."

<sup>34</sup> II Corps, "Operations Plan 98-1."

<sup>35</sup> Ibid.



<sup>36</sup> II Corps, "Operations Plan 98-1."

<sup>37</sup> Ibid.

<sup>38</sup> Robert H. Scales, Jr., Brigadier General, USA, Certain Victory: The US Army in the Gulf War (Fort Leavenworth, KS: US Army Command and General Staff College Press, 1994), 193-194.

## CHAPTER SIX

### CONCLUSIONS AND RECOMMENDATIONS

Air and ground commanders must be constantly on the alert to devise and use new methods of cooperation.... There can never be too many projectiles in a battle. Whether they are thrown by cannon, rockets, or recoilless devices is immaterial. The purpose of all these instruments is identical--namely, to deluge the enemy with fire.<sup>1</sup>

General George S. Patton, Jr., War as I Knew It

This thesis assessed whether the preponderance of forces should be a primary consideration in determining FSCL placement. As pointed out in joint doctrine, several situation-specific factors (METT-T) influence placement. However, planners take these factors into account when developing courses of action and reflect their impact in the alignment and use of LCC and ACC forces. It is at this point where FSCMs, including FSCL placement, should be applied to enhance the effectiveness of the joint forces and create the conditions for success.

The term "preponderance of forces" is already used in the legal jargon of the JPs where it is accepted and applied in the delegation of component command authority. In the context of this thesis, the term simply implies that the component commander with the "most" forces should be the person charged with coordinating operations in that area. The thesis assumes that the commanders

and their staffs can equitably quantify and compare the diverse forces participating in combat operations (e.g., compare one F-16 aircraft loaded with cluster bombs on an AI mission with three ATACMS Block I missiles).

Two scenarios illustrate extreme examples in the use of an FSCL based on the preponderance of forces. In scenario one, LCC maneuver and firepower are dominant throughout the AO and no FSCL needs to be established, as it corresponds to the AO forward boundary. Factors such as host nation or political restrictions to land-based airpower, fear of collateral damage, weather, and terrain might put extreme limits the effectiveness of airpower. In this scenario, most force is applied by or in close coordination with LCC forces. The enemy's fielded army is probably the center of gravity. If a large number of ATACMS and aviation assets constitute the preponderance of force throughout the AO, then the limited number of AI and strategic attack sorties would need to be coordinated with the LCC.

In scenario two, airpower is the dominant force with the FSCL extremely close to ground units possessing limited firepower. Factors such as limited time to project land forces and political constraints to the fielding of these forces and their weapons put severe limits on LCC capability. In this scenario, extensive air strikes are used to halt a sudden enemy advance with the LCC providing lightly-equipped forces in defense. Accordingly, ACC forces provide the firepower and the preponderance of forces across the depth and breadth of the AO. This occurred during defensive operations in the Korean War, where the FSCL was placed as close as 300 meters to the FLOT.<sup>2</sup> In general, any LCC force capable

of firing beyond this range would coordinate with the ACC. However, the inability to coordinate would not necessarily preclude any required use of force.

The most realistic scenarios are somewhere between these extreme situations. The historical and conceptual analyses assessed thesis validity in two of them. An analysis of Operation DESERT STORM showed that when the FSCL corresponded to the preponderance of forces, joint operations were effective and successful. When the FSCL placement did not reflect the preponderance of forces, joint operations were inhibited and less successful. The PW 98 analysis demonstrated that a preponderance of force FSCL can be determined in the planning stage, and that establishment here tends to facilitate joint employment.

### Conclusions

The thesis approach makes FSCL placement less nebulous in terms of factors to consider and tends to maximize, not inhibit, the employment of joint firepower. Given the volatility of the FSCL issue, the approach provides a simplified means to evaluate appropriateness. There are still issues to be resolved in the application of FSCMs, as problems in fielding JP 3-09 demonstrate.<sup>3</sup> Thesis analysis underscored that better integration of forces must occur on both sides of the FSCL.

The utilization of FSCMs as currently advocated in the draft JP 3-09 tends to promote an FSCL concept suited to a smaller scale contingency, as in a potential US Marine Corps construct, where direct air support is primarily utilized

to provide tactical fire support within a limited AO with limited objectives.<sup>4</sup>

Generally, this use of firepower and FSCMs is not suitable in a MTW with operational-level combat objectives in a JOA. JFCs must balance the significance of the land maneuver scheme, interdiction plan and strategic attack plan to ensure FSCMs are applied appropriately.

As always, optimal joint operations are the result of effective teamwork and execution. The LCC must have an awareness and understanding of all forces operating in the AO and act to reduce inhibitors to their effectiveness. "The most reliable way to maximize the enemy's risk is to place the FSCL at the range where artillery and missiles stop being the greatest threat to the enemy and air attack becomes the greatest threat."<sup>5</sup>

### Recommendations

Throughout the JPs and particularly in JP 3-09, doctrine should be modified to highlight the importance of considering a preponderance of forces in FSCL placement. For example, JP 3-0, Doctrine for Joint Operations, page III-34, should include the sentence: "In addition to these factors, the land or amphibious force commander should consider the preponderance of all forces applying firepower in the area of operations (AO) and establish the FSCL corresponding to the depth at which that commander no longer controls the preponderance."

Consensus over the doctrinal issues contained in JP 3-09 must be reached. The joint firepower directives are critical to future success and the

applications must be implemented and exercised. Targeting priority issues must continue to be addressed and resolved. Clearly, perceptions of improper targeting plans have exacerbated the challenges of determining appropriate FSCL placement.

#### Areas of Further Study

The analysis in chapters 4 and 5 demonstrates that, without the aid of digital computing systems, preponderance FSCL determination is somewhat tedious and inexact. The sheer magnitude of data is difficult to manage without such processing capability. A current initiative to connect the USAF Contingency Theater Automated Planning System (CTAPS) and the USA AFATDS interoperability could facilitate determination.<sup>6</sup> As more digitally advanced systems are fielded with the capability to facilitate FSCL determination, commanders can focus their decision-making energies elsewhere. Operators of CTAPS and AFATDS could be charged with the FSCL establishment based on preponderance of forces guidance and the coordination of joint fires between the LCC and ACC.<sup>7</sup>

Even if the concept of a preponderance of force FSCL is accepted, much more research is clearly needed in determining the means to quantify forces to decide which component provides preponderance. Beyond the scope of this thesis, it may pertain to expected effects on targets, the number of weapons systems employed, projectiles fired, or the amount of explosive weight delivered.

Digital systems could facilitate value determinations in the meshing of military art with military science.

Future studies should investigate the impact of C2 on FSCL placement. In addition to the preponderance of forces, the ability to command and control is an important consideration in FSCL placement. It may be presumptuous to assume that the preponderance of force is accompanied by the most capable C2 means. This C2 capability, not preponderance of force, provides unity of effort and the deconfliction of firepower.

Although beyond the scope of this thesis, the review of literature indicated a change in terminology must be considered. Although several valid and descriptive terms have been suggested in recent years, the author recommends investigation of the term "Joint Fire Coordination Line" (JFCL) to replace the term "Fire Support Coordination Line." This change might reduce preconceived biases, often along service lines, inherent to the current term. The preponderance of forces could be a primary consideration in JFCL location, used to delineate coordination authority. Application would be "restrictive," with the LCC required to coordinate fires beyond the JFCL with the ACC. An LCC desiring to fire beyond the JFCL would be required to "consult with" as opposed to merely "inform" the ACC. As with the FSCL, an inability to coordinate would not preclude a necessary attack.

Systems with digital connectivity (such as AFATDS and CTAPS) should be upgraded to facilitate determination of where the changeover in preponderance of force occurs and be utilized to coordinate the JFCL. When LCC and ACC direct

coordination is impractical or unproductive, the JFC should adjust JFCL location based on an assessment of the combat situation.

### Final Remarks

Recent US military operations have highlighted deficiencies in the application of FSCMs. US forces continue to build the capability to fight deeper and with greater lethality. Doctrine must be adapted to maximize the effects of firepower on the enemy. The efficient orchestration of joint forces will be critical to future success and leadership must identify the forces providing the largest input in each situation. Finally, effective measures must be implemented to facilitate joint employment success. Then and only then can the full US military might be quickly and efficiently brought to bear against the enemy.

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<sup>1</sup> George S. Patton, Jr., General, USA, War as I Knew It (Cambridge: Riverside Press, 1947), 357.

<sup>2</sup> US Air Force, JFACC Primer (Washington, DC: Department of the Air Force, 1994), 33.

<sup>3</sup> Scott Schaeffer, Major, USAF, USAF Doctrine Center, personal interview by author, Leavenworth, KS, 10 November 1997.

<sup>4</sup> David H. Zook, Major, USA, "The Fire Support Coordination Line: Is it Time to Reconsider Our Doctrine?" (MMAS thesis, Command and General Staff College, Fort Leavenworth, KS, 1992), 54.

<sup>5</sup> JFACC Primer, 34.

<sup>6</sup> Patrecia S. Hollis, "Making the Most of Air Power, An Interview with General Ronald R. Fogleman, Chief of Staff of the Air Force," Field Artillery Journal (September-October 1996): 5.

<sup>7</sup> Ibid.



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